3

RESIDENTIAL PROPERTIES

OVERVIEW

The residential portion of the fire problem accounts for 71 percent of fire deaths and 68 percent of the injuries to civilians. It also accounts for more firefighter injuries than any other occupancy category. This section reviews the residential problem overall, and subsequent sections present details of the fire problem for major subcategories of residential properties (one- and two-family dwellings, apartments, hotels and motels, and other types.)

The term *residential* as used in NFIRS includes what is commonly referred to as homes, whether they are one- or two-family dwellings or multifamily apartment buildings. It also includes manufactured housing, hotels and motels, residential hotels, dormitories, and much of what might be considered "halfway houses" for the care of people with problems but able to operate in the community. The term does not include "institutions" such as prisons, homes for the elderly, juvenile care facilities, or hospitals, though many people may reside in them for short or long periods of time.

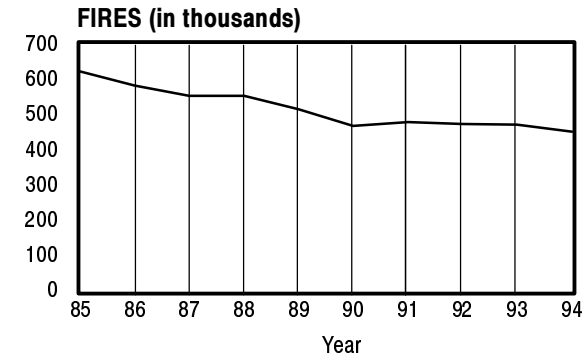
Figure 33 shows the 10-year trend in residential fires, deaths, injuries, and dollar loss. Both numbers of fires and deaths have trended downward dramatically over the past 10 years (28 percent and 32 percent, respectively), although there has been relatively little change over the past 4 years. Injuries trended up to 6 percent, and dollars loss trended down 8 percent when adjusted for inflation. These results are based on the NFPA annual surveys of fire departments.[1]

Types of Residences

Figure 34 shows the relative proportions of fires, fire deaths, injuries, and dollar loss among the residential categories in 1994.

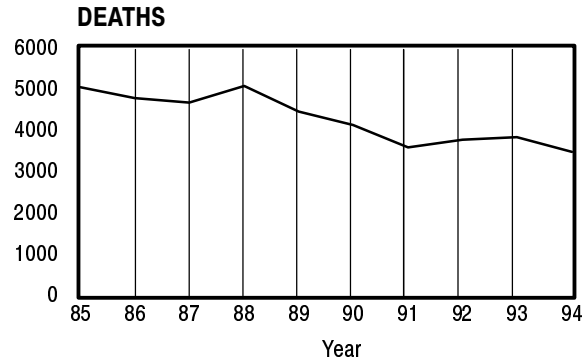
One- and two-family dwellings, where the majority of the U.S. population lives, dominate the residential statistics: 70 percent of residential fires, 69 percent of residential deaths, 60 percent of residential injuries, and 73 percent of residential dollar loss.

[1] A second approach to making these estimates is to use the percentage of fires that are residential from NFIRS (shown in Figure 27, Chapter 2), scaled up (multiplied by) the NFPA estimate of total fires. The results are somewhat different from those using the NFPA subtotals. We have used the NFPA residential totals for scaling residential fires because they are consistent with the total number of fires from NFPA. Better estimates from NFIRS will not be available until more of the participating NFIRS departments provide accurate "population protected" data.



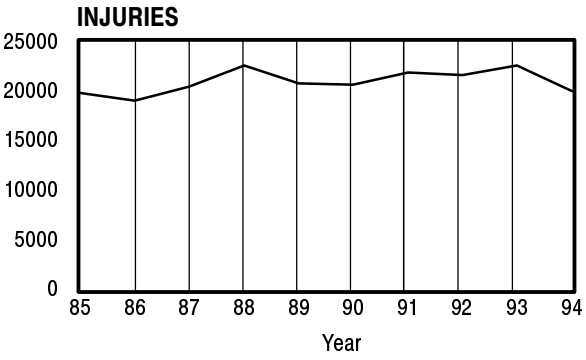
1985	622.0	1990	467.0
1986	581.5	1991	478.0
1987	551.5	1992	472.0
1988	552.5	1993	470.0
1989	513.5	1994	451.0

10-Year Trend = –27.9%



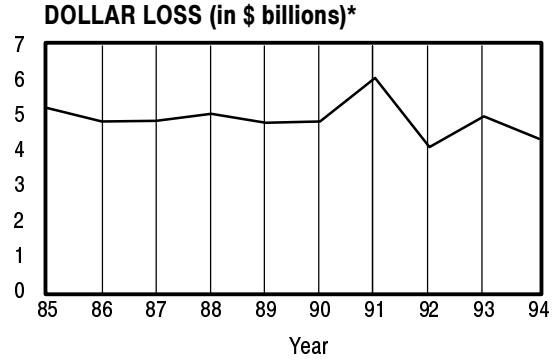
1985	5,025	1990	4,115
1986	4,770	1991	3,575
1987	4,660	1992	3,765
1988	5,065	1993	3,825
1989	4,435	1994	3,465

10-Year Trend = –31.6%



1985	19,825	1990	20,650
1986	19,025	1991	21,850
1987	20,440	1992	21,600
1988	22,600	1993	22,600
1989	20,750	1994	20,025

10-Year Trend = +6.1%



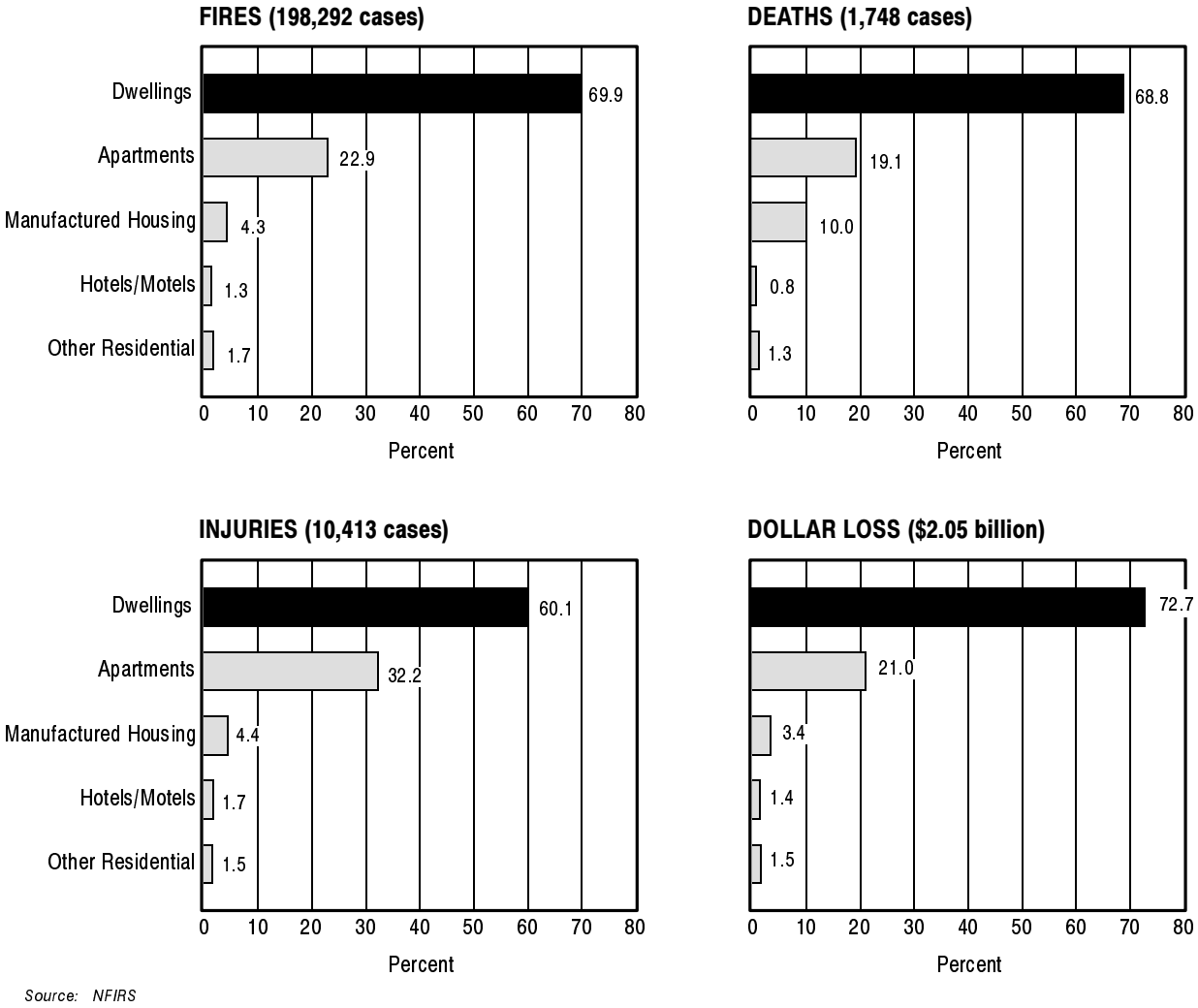
1985	$5.2	1990	$4.8
1986	4.8	1991	6.0
1987	4.8	1992	4.1
1988	5.0	1993	5.0
1989	4.8	1994	4.3

10-Year Trend = –7.9%

*Adjusted to 1994 dollars

Sources: NFPA Annual Surveys and Consumer Price Index

Figure 33. Trends in Residential Fires and Fire Losses



Source: NFIRS

Figure 34. 1994 Residential Fires and Fire Losses by Property Type

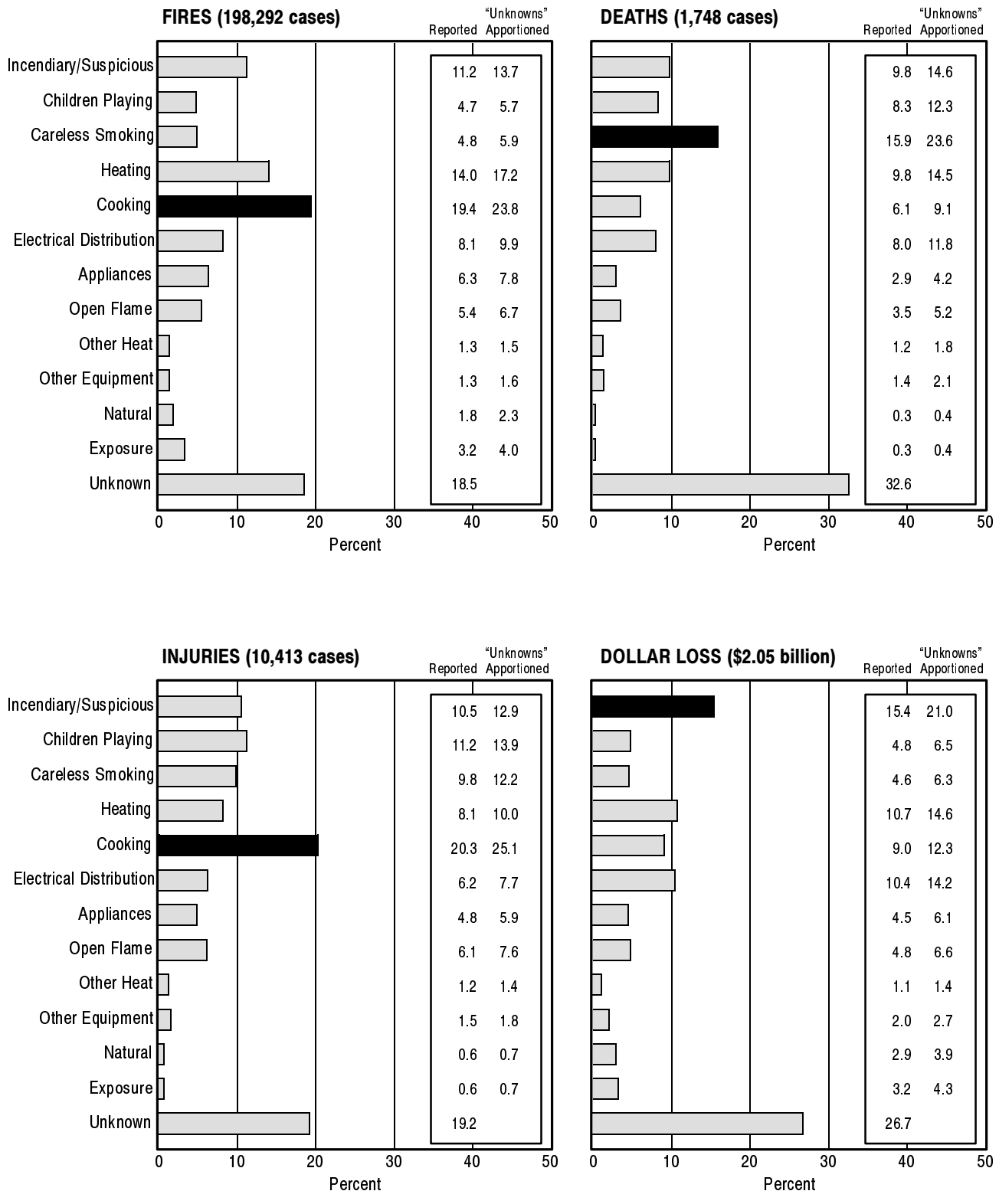
Apartments account for 19 to 23 percent of these problems except for injuries, where they account for 32 percent. This higher incident of injuries may be because the total space and number of exits are significantly less in apartments than in dwellings.

Manufactured housing, separated from the dwelling category, have 2.5 times the number of deaths (10 percent) as number of fires (4 percent). Deaths per fire are approximately twice as high for manufactured housing as for other dwellings.

Hotels and motels, the target of legislation requiring sprinklers in the mid 1980s, account for just over 1 percent of the residential fire problem in the various measures.

Causes

Figure 35 shows the leading causes of fires, deaths, injuries, and dollar loss in 1994. They are dominated by the causes of one- and two-family dwellings, which account for the majority of residen-



Source: NFIRS

Figure 35. Causes of 1994 Residential Fires and Fire Losses

tial fires. The overall residential figures and those for one- and two-family dwellings discussed in the following section will seem to be quite similar. Larger differences from the overall residential causes will be found as one looks at the smaller subcategories of residences such as apartments and manufactured housing. Considering residential property types as a whole, the leading causes of fires are cooking, heating systems, and incendiary and suspicious.

Cooking, the leading cause of residential fires in 1994, has been the leading cause of residential fires most of the years since NFIRS inception. Heating passed cooking in the late 1970s when there was a surge in the use of alternative space heaters and wood heating. Cooking by far is the leading cause of fire injuries, nearly twice that of any other cause. Many cooking fires come from unattended cooking. These fires can be lessened by emphasizing the importance of vigilance while cooking. Also, the public should be better informed as to how to extinguish small cooking fires (e.g., a pot or pan lid, dousing it with baking soda). Wearing loose-fitting clothing such as bathrobes can be dangerous around cooking areas. Cooking, however, is only sixth leading cause of fire deaths.

Heating, the second leading cause of residential fires, includes those fires where the equipment involved in ignition is central heating, fireplaces, portable space heaters, fixed room heaters, wood stoves, and water heating. The central and water heating portions of the problem have remained relatively steady, while the portable space heater and wood burning stove portion of the problem, along with chimney fires, rose very sharply from the late 1970s to the early 1980s, but has since subsided somewhat. This last group seems to be the more volatile portion of this category of residential fires. Heating-related fires are also the second leading cause of dollar loss in residences and in fire deaths.

Incendiary and suspicious, which is called "arson" here even though that term has a narrower legal definition, is the leading cause of dollar loss, the second leading cause of fire deaths, and the third leading cause of fires and injuries in residences. That arson is so prominent a factor in the residential fire problem may be a surprise to many. There are a number of factors to residential arson fires—vandalism, revenge, fraud, and quarrels are common motives according to fire officials.[2] Because arson plays such a major role in the overall fire problem, this topic is examined in detail in Chapter 6.

It is important to note that the leading causes are different depending on what measure is used, as can be seen from Figure 35. The top three causes from each point of view are listed in Table 5.

Table 5. Leading Causes of 1994 Residential Fires and Fire Losses

[Numbers in parentheses reflect the 1990 ranking]

Rank	Fires	Deaths	Injuries	Dollar Loss
1	Cooking (1)	Careless Smoking (1)	Cooking (1)	Arson (1)
2	Heating (2)	Arson (2)	Children Playing (4)	Heating (2)
3	Arson (3)	Heating (3)	Arson (3)	Electrical (3)

Sources: NFIRS and Eighth Edition, Fire in the United States

[2] Motives are not reported to NFIRS, but are tabulated by some arson units.

In terms of residential fire deaths (and fire deaths overall), careless smoking is the leading cause, but in 1994 plays a less significant role than it did previously (down 2 percentage points from 1990). In terms of injuries and total fires, cooking is by far the leading cause. For dollar loss in residences, arson is the leading cause. The rank order of causes also varies among subcategories of residences, as discussed later.

Trends of Residential Causes

Figure 36 on the following four pages shows the trends in the causes of residential fires over the years 1985–1994.[3] All of these trends would appear lower if presented as per capita rather than in the absolute, because the population increased by an estimated 9 percent over the 10 years. Any upward change less than this population increase or any downward change at all represents doing better than expected over this period. One significant change in 1994 is that the hotel/motel category is now counted under "other" residences; therefore, certain data could not be collected for the hotel/motel category in 1994.

In terms of numbers of fires, the number of heating fires has decreased more than 50 percent over 10 years and in 1990 dropped to second place, where it continues. Cooking has remained relatively constant and was the leading cause of residential fires in 1994. Incendiary and electrical distribution fires declined very slightly and are in third and fourth places, respectively.

For fire deaths, careless smoking remains the leading cause, but the number of deaths has dropped significantly in 10 years to its lowest level in 1994. This drop can be attributed to the overall decline in fire deaths and, in part, to the greater use of smoke detectors in the home. Heating peaked in the late 1970s, but has fallen sharply since. Although arson dropped to its lowest level in 1994, overall it is in second place, just above heating. Children playing as a cause of fire deaths rose until 1988 but has since declined.

For fire injuries, the leading cause, cooking, has risen steadily since 1985, although there was a significant drop in 1994. Children playing is the second leading cause of injuries. Incendiary injuries have risen steadily since 1985 and in 1994 became the third leading cause. Careless smoking injuries pinnacled in 1988 and have fallen steadily to the fourth leading cause of injuries in 1994.

For dollar loss, incendiary has dipped and risen, always maintaining its hold on first place. Heating has dropped significantly, but it continues in second place. Electrical distribution and cooking are in third and fourth places, respectively.[4]

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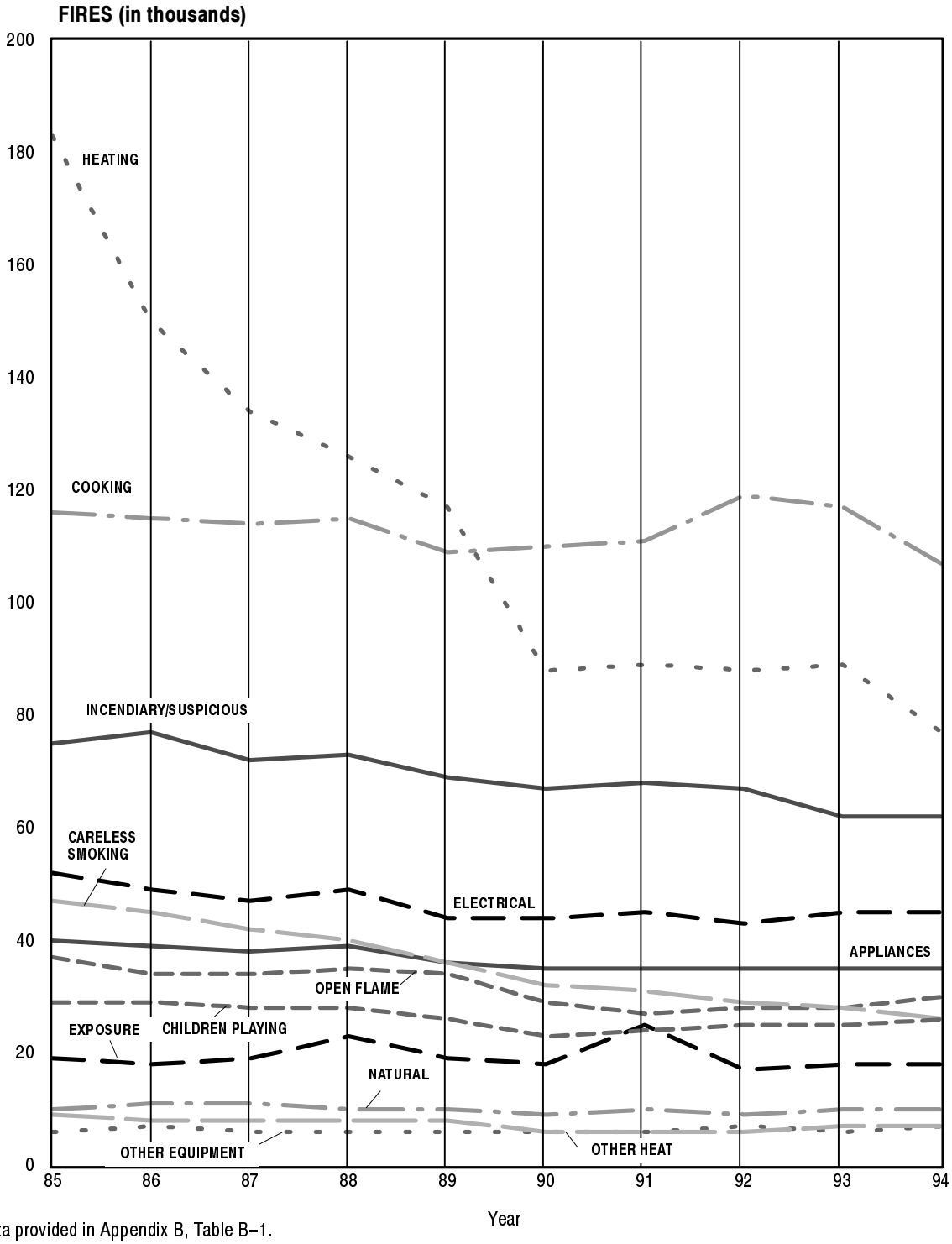
[3] The data for each point on these figures may be found in Table B–1, Appendix B. Similar tables are presented in Appendix B for other graphs where data cannot conveniently be shown on the graph itself.

[4] When analyzing dollar loss trends, any precipitous increases must be checked to see if they might be due to errors in entering data for one or two fires. Often this happens when the data are entered on the incident report form left-adjusted instead right-adjusted. A $100 fire can be entered as a $100,000,000 fire.



Note: Data provided in Appendix B, Table B–1.

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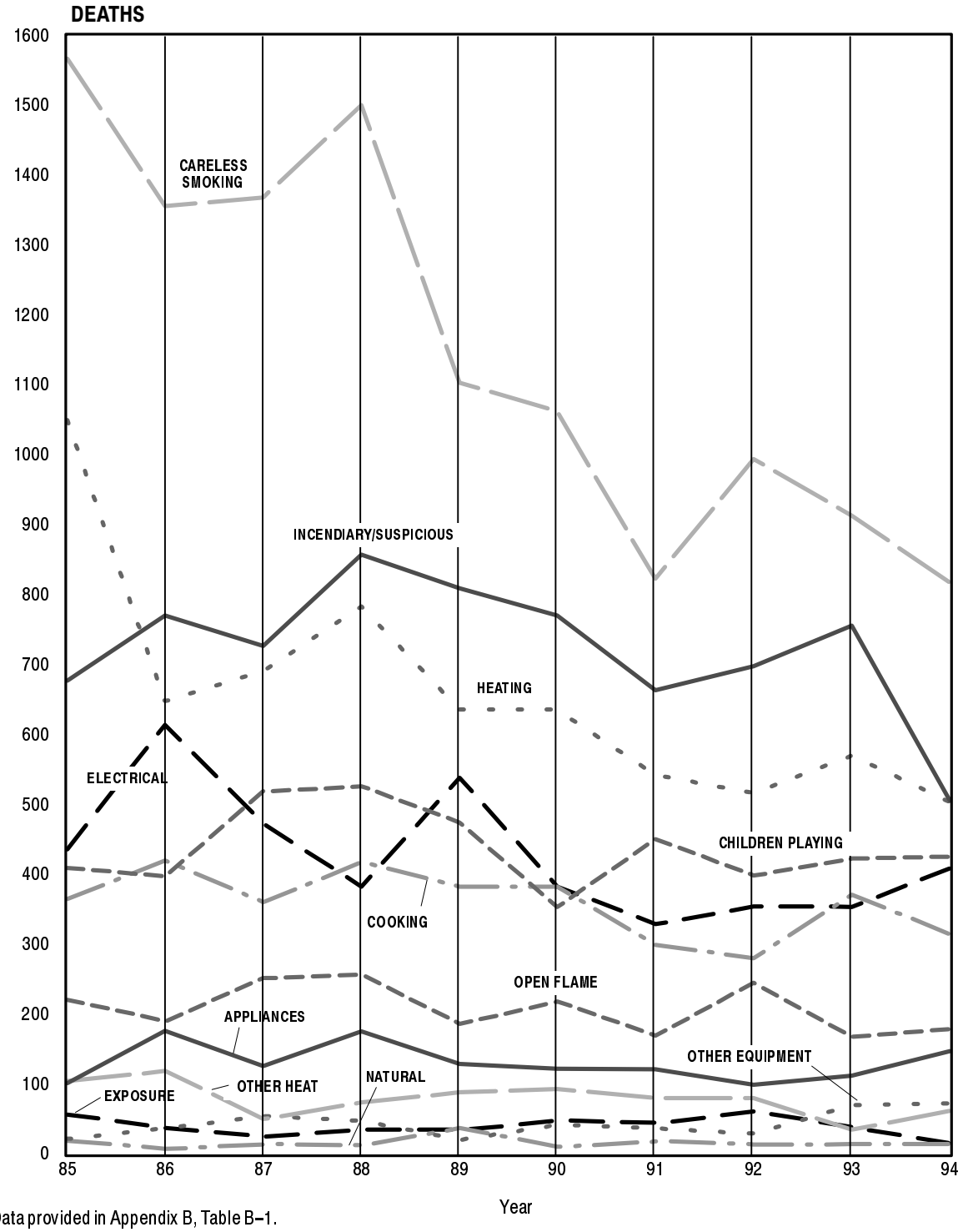
Figure 36. Trends in Causes of Residential Fires and Fire Losses



Note: Data provided in Appendix B, Table B–1.

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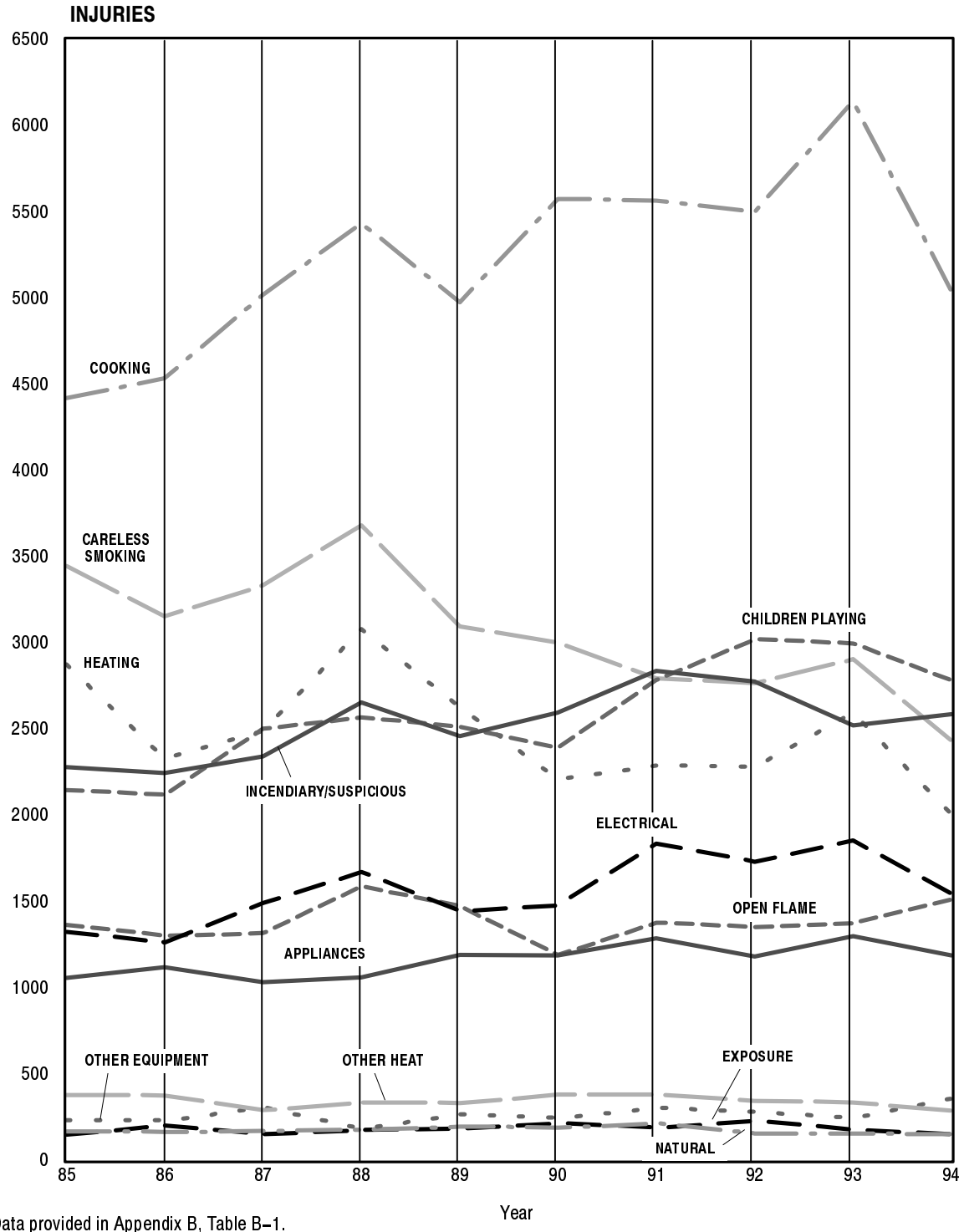
Figure 36. Trends in Causes of Residential Fires and Fire Losses (cont'd)



Note: Data provided in Appendix B, Table B–1.

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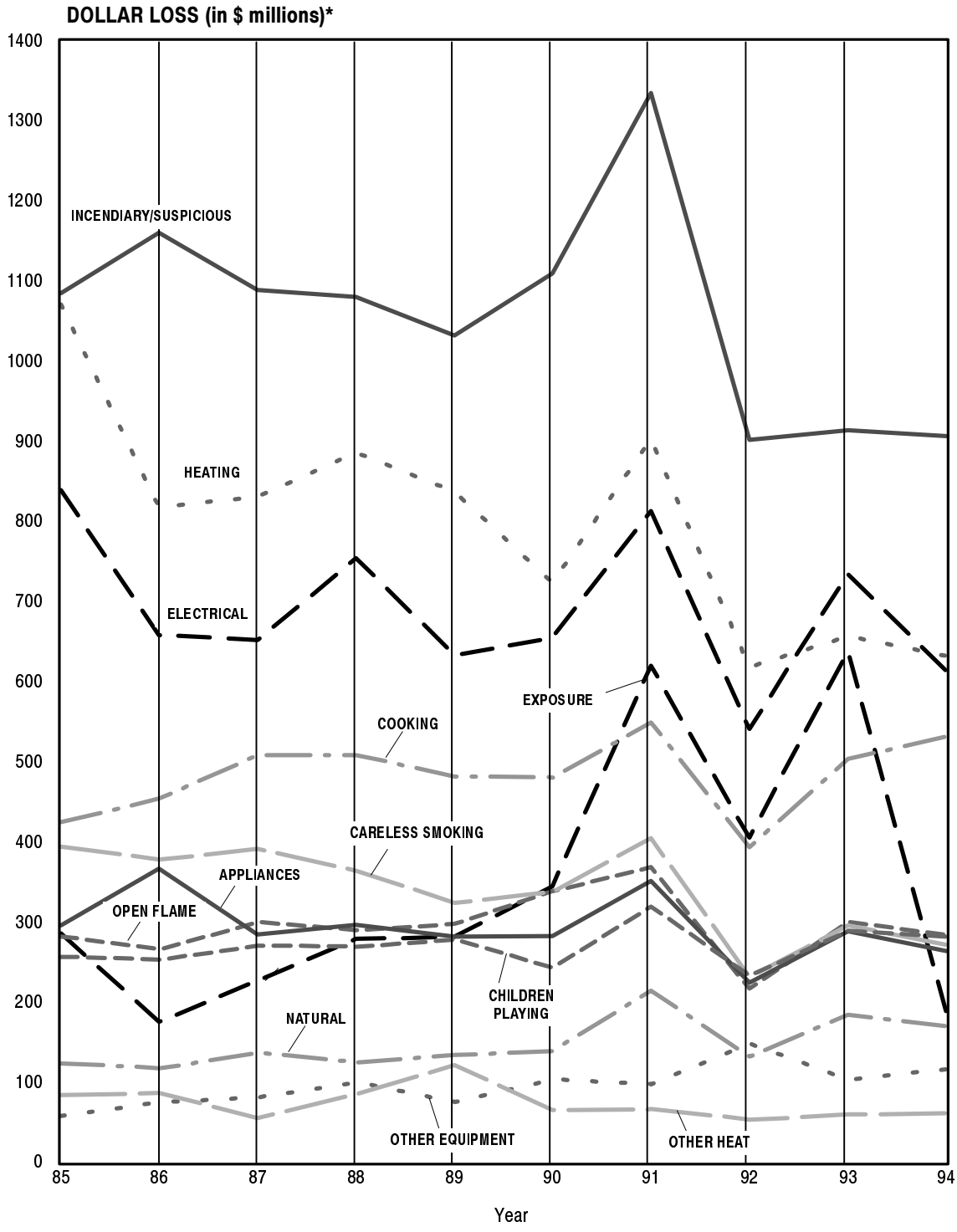
Figure 36. Trends in Causes of Residential Fires and Fire Losses (cont'd)



Note: Data provided in Appendix B, Table B–1.

*Adjusted to 1994 dollars

Sources: NFPA Annual Surveys and NFIRS

Figure 36. Trends in Causes of Residential Fires and Fire Losses (cont'd)

Smoke Detector Performance

Smoke detectors are thought to account for a significant part of the decrease in reported fires and fire deaths since the mid 1970s. From previous surveys, we know that at least 88 percent of U.S. households have at least one smoke detector.[5] Only 39 (unadjusted) percent of households that had fires were reported to have detectors; considering only the incidents where smoke detector performance was reported, this percentage rises to 57 percent, still considerably less than the national average (Figure 37). Still, there has been a 33 percent rise since 1990. Households that have reported fires appear much less likely to have smoke detectors than others. Either people with detectors are more safety conscious or the detectors allow early detection and extinguishment so that the fires are not reported. Also, anecdotal information indicates that reported fires are more prevalent in older, less well cared for homes, and these are less likely to be equipped with a detector.

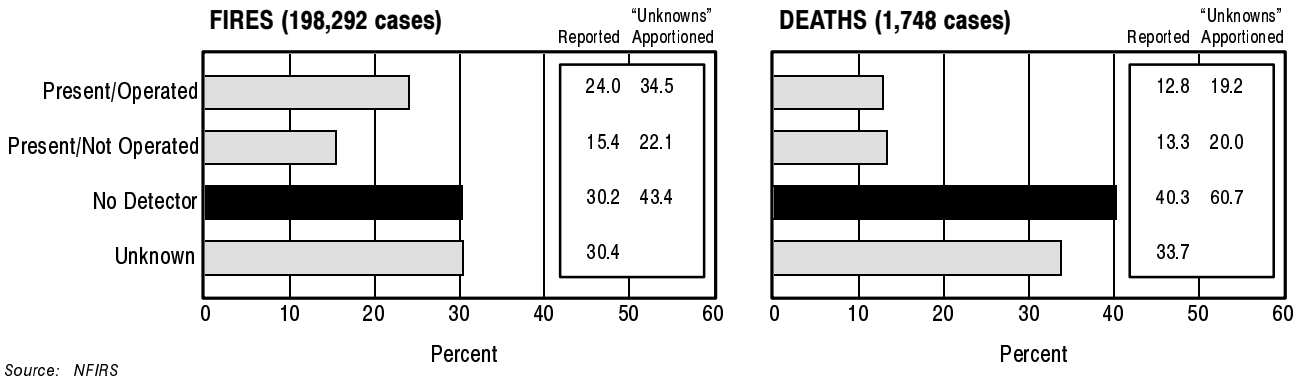


Figure 37. Smoke Detector Performance in 1994 Residential Fires and Fire Deaths

In only 35 percent of the residential fires where smoke detector performance was reported did a detector operate in the fire. That is, there was either no detector or the detector did not operate in at least 65 percent of the reported household fires. This figure is down from 71 percent in 1990.

As shown in Figure 37 for fire fatalities, detectors were not present in 61 percent of the fatalities in 1994, about 50 percent more than was the case for fires. In 19 percent of fire deaths, a detector did operate; this was the same percentage as in 1990. This is somewhat disturbing since there is a widespread belief that an operating detector will save lives. In some of these cases, the detector may have gone off too late to help the victim, the victim may have been too inebriated or feeble to react, or the fire may have been too close to the victim. Such cases merit further study.

When detectors were present in fires (57 percent), their performance based on where they were installed is shown in Table 6.

[5] *The Smoke Detector Operability Survey Report on Findings*, Consumer Product Safety Commission, Revised October 1994.

Table 6. Performance of Detectors When Present (Adjusted Percentages)

Detector Present	Present and Did Operate	Present but Did Not Operate	Total Present
In room of origin	20	7	27
Not in room of origin	15	11	26
In room, but fire too small	N/A	4	4
Total	35	22	57

Source: NFIRS

When households do have detectors and the fire is not small, they did not work in about one-third of the cases. The statistics are somewhat unclear because detector performance was not reported in 30 percent of the fires.

Figure 38 shows the trend of detector performance in fires and fire deaths. There has been an encouraging drop over 10 years in the percent of fires as well as the percent of fire deaths with no detector present—fires from 44 percent to 30 percent and fire deaths from 56 percent to 40 percent. Correspondingly, the percentage of fires where a detector operated has doubled from 12 percent to 24 percent. However, the percentage of fires where a detector was present but did not operate also increased. Public education programs need to focus on the proper maintenance of smoke detectors to reverse this trend.

Residential Sprinklers

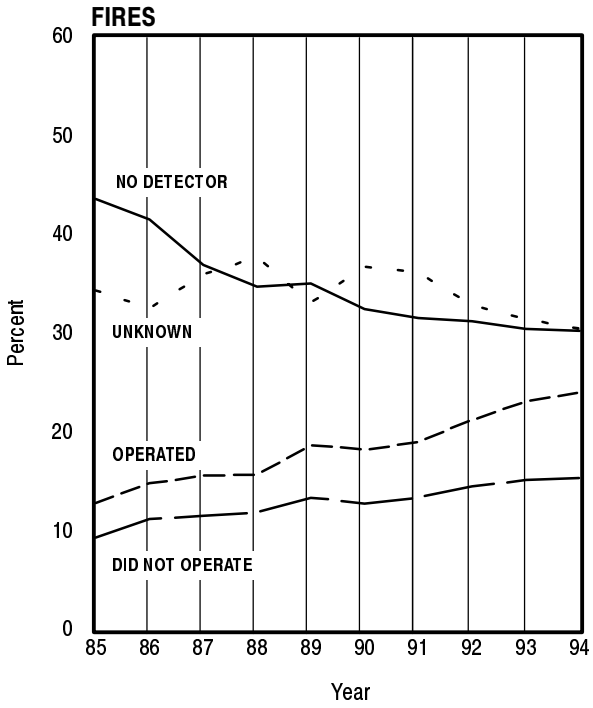
Residential sprinklers are found in only a small fraction (2 percent) of residences other than hotels and newer apartment buildings today. Therefore, it is no surprise that they are reported to be present in only a small percentage of residential fires nationally, though they represent a great potential in the future.

Sprinkler data were reported in 3,890 residential fires out of the 198,292 cases reported to NFIRS in 1994 (Figure 39). They operated in 1,460 cases and did not operate in 2,430 fires, mostly because the fire was too small. In 21 percent of the total cases, sprinkler performance was not reported, a decrease of 50 percent since 1990.

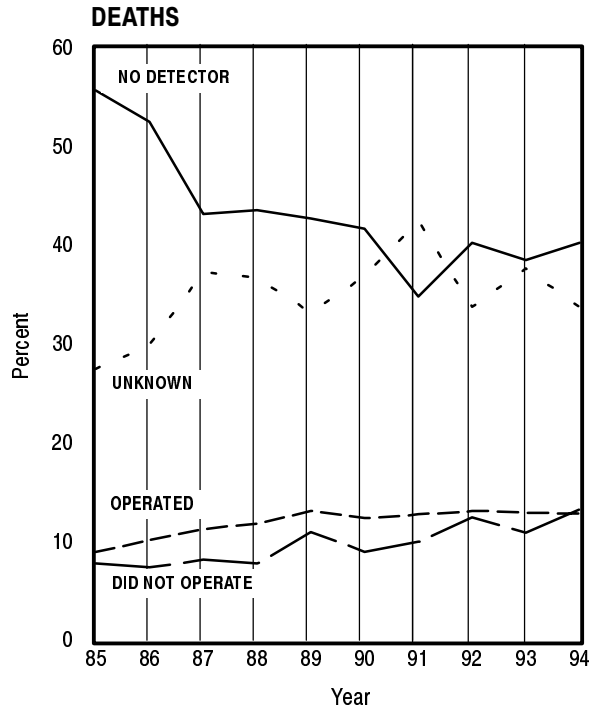
The trend in use of residential sprinklers has been upward (Figure 40). However, the percentages are still minuscule because most homes are not equipped with sprinklers. They were reported as present in 1 percent of the residential fires in 1985 versus 2 percent in 1994. They operated 0.7 percent of fires in 1994, up from 0.3 percent in 1985.

When Fires Occur

TIME OF DAY. Fires do not occur uniformly throughout the day, as shown in Figure 41 (two pages). Fire incidents peak from 5:00 p.m. to 7:00 p.m., when cooking fires most occur. Fire incidents drop when people sleep.



	No Detector	Operated	Did Not Operate	Unknown
1985	43.6%	12.8%	9.3%	34.3%
1986	41.5	14.8	11.2	32.5
1987	36.9	15.6	11.5	36.0
1988	34.7	15.7	11.9	37.7
1989	35.0	18.6	13.3	33.1
1990	32.4	18.2	12.7	36.7
1991	31.5	19.0	13.4	36.1
1992	31.2	21.2	14.5	32.8
1993	30.4	23.1	15.1	31.4
1994	30.2	24.0	15.4	30.4



	No Detector	Operated	Did Not Operate	Unknown
1985	55.7%	9.0%	7.8%	27.5%
1986	52.5	10.2	7.4	29.9
1987	43.2	11.3	8.2	37.3
1988	43.6	11.9	7.8	36.7
1989	42.7	13.1	11.0	33.2
1990	41.7	12.4	9.0	36.9
1991	34.8	12.8	10.0	42.5
1992	40.3	13.1	12.5	33.8
1993	38.5	12.9	10.9	37.7
1994	40.3	12.8	13.3	33.7

Source: NFIRS

Figure 38. Trends in Smoke Detector Performance in Residential Fires and Fire Deaths

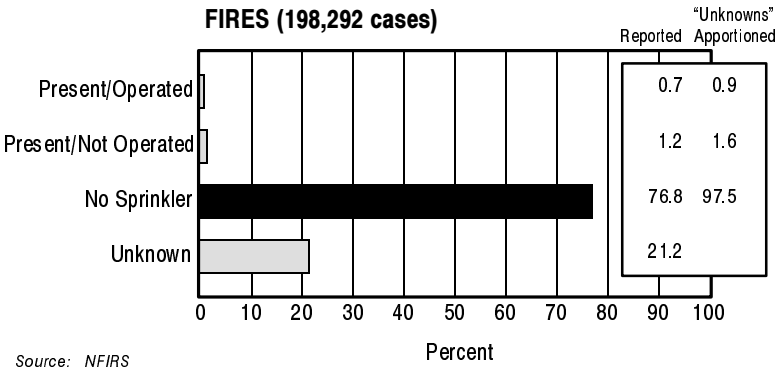
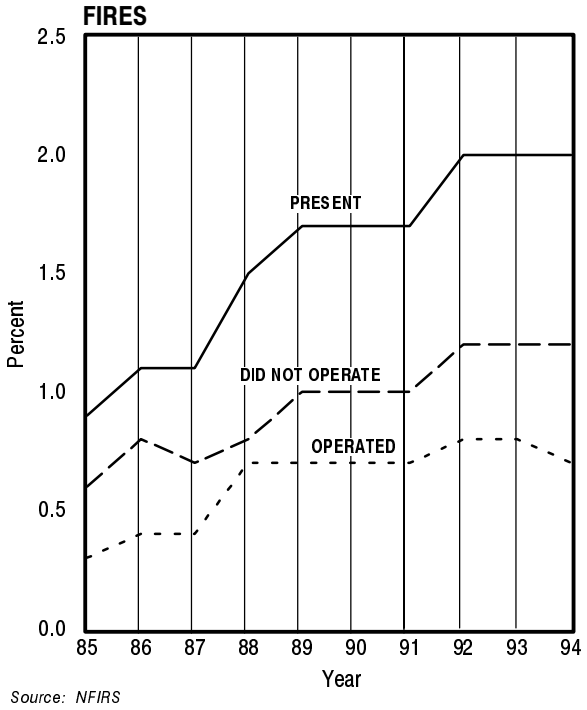


Figure 39. Sprinkler Performance in 1994 Residential Fires



	Present	Operated	Did Not Operate
1985	0.9%	0.3%	0.6%
1986	1.1	0.4	0.8
1987	1.1	0.4	0.7
1988	1.5	0.7	0.8
1989	1.7	0.7	1.0
1990	1.7	0.7	1.0
1991	1.7	0.7	1.0
1992	2.0	0.8	1.2
1993	2.0	0.8	1.2
1994	2.0	0.7	1.2

Figure 40. Trends in Sprinkler Performance in Residential Fires

Fire deaths are usually associated with fires that start late at night and early morning. Nearly half of residential fire deaths occur in fires that start from 11:00 p.m. to 6:00 a.m. The peak night hours are from 3:00 to 5:00 a.m. when people are in deep (REM) sleep.

Fire injuries occur more uniformly throughout the day, peak slightly during dinner hours when people cook, and actually drop to their low point early in the morning hours.

The sharp peak in dollar loss in 1994 is between 7:00 p.m. and 8:00 p.m. Dollar loss is otherwise relatively constant, again with a drop in the early morning hours.

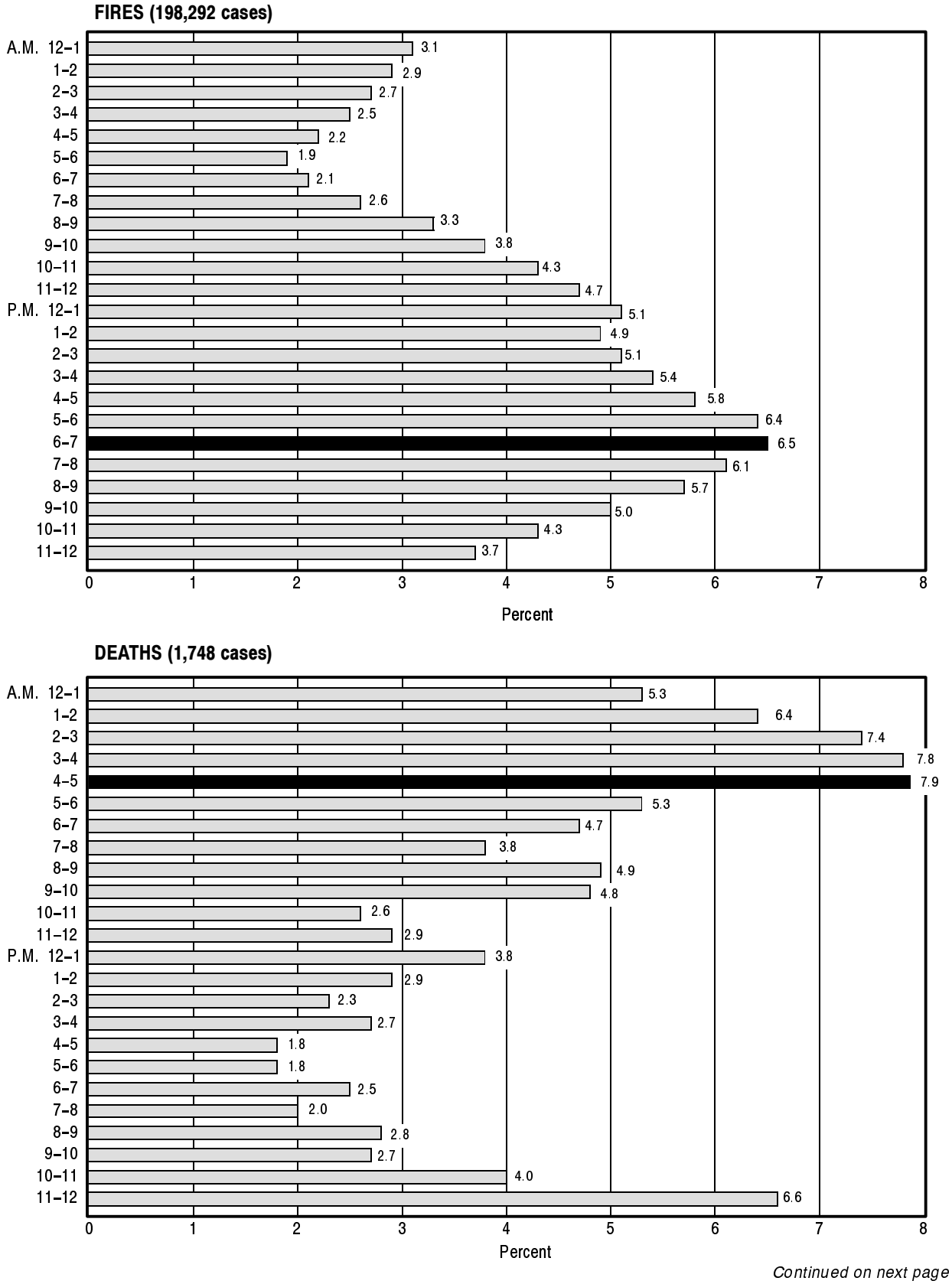


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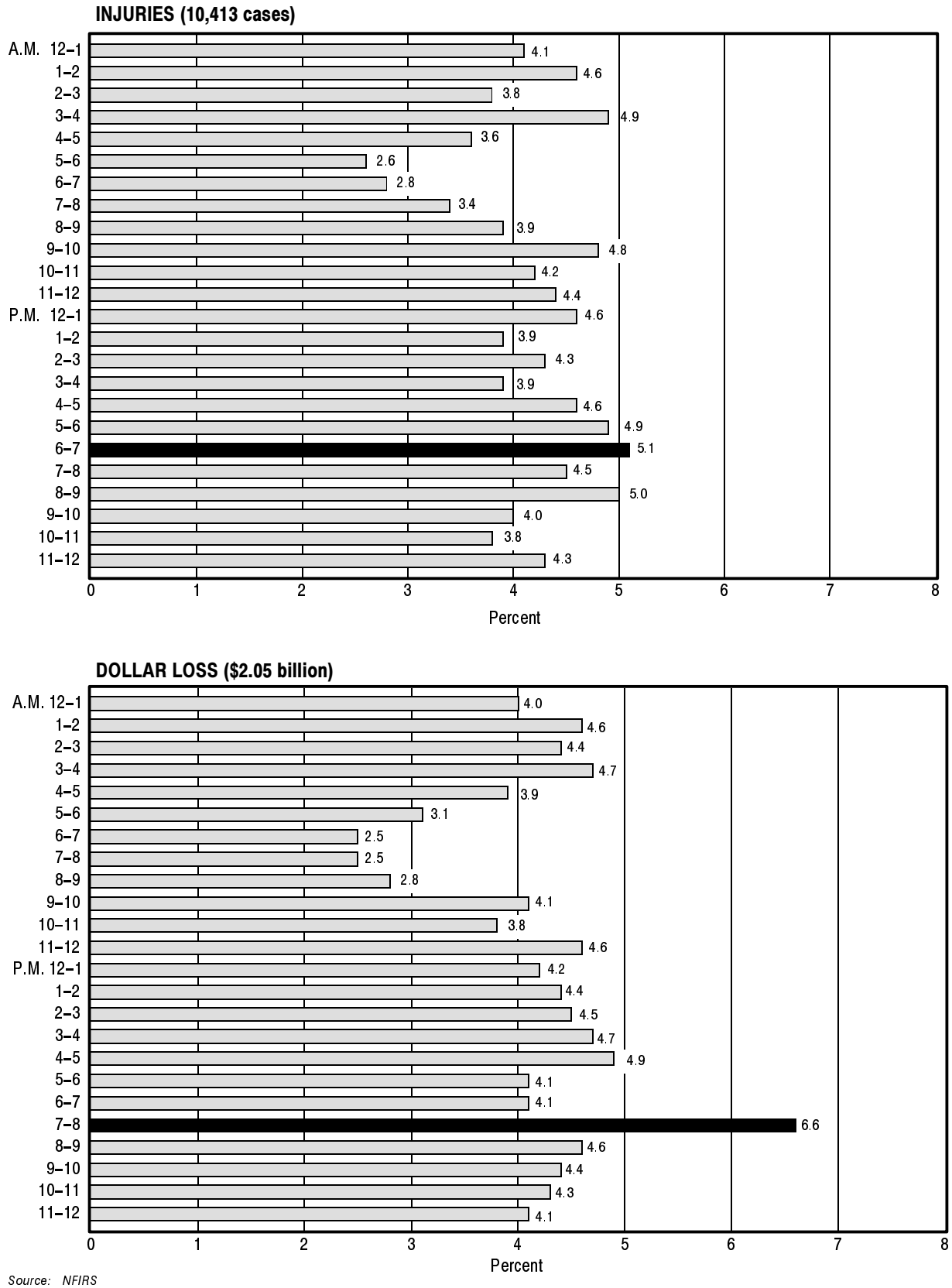
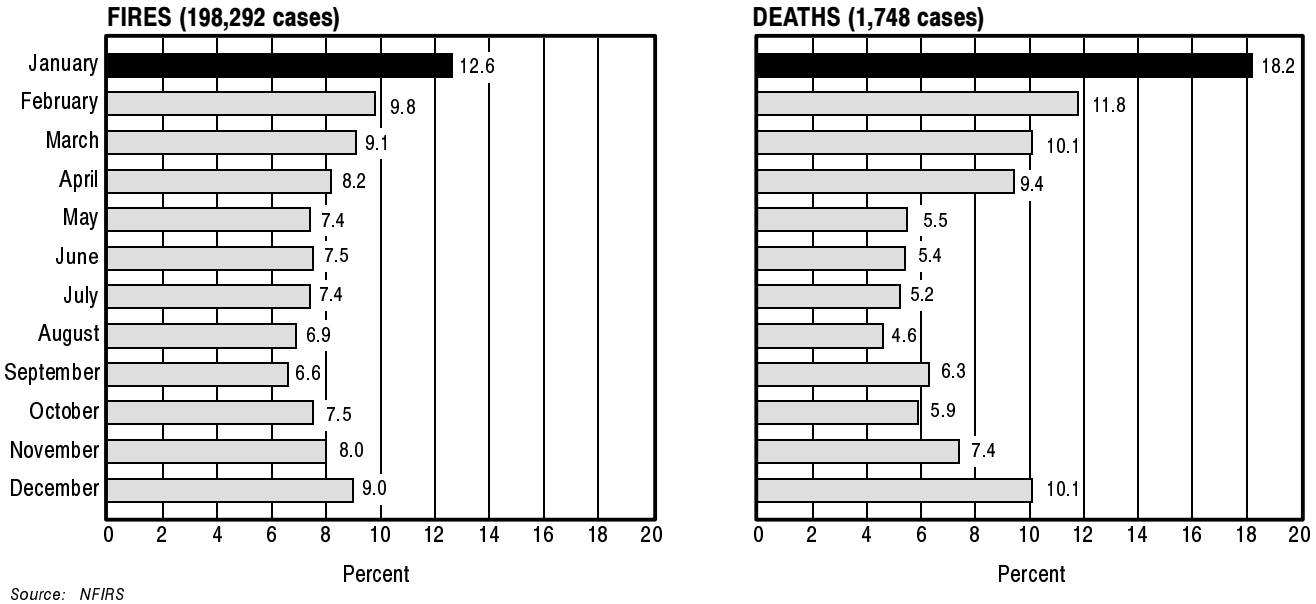
Figure 41. Time of Day of 1994 Residential Fires and Fire Losses



Source: NFIRS

Figure 41. Time of Day of 1994 Residential Fires and Fire Losses (cont'd)

MONTH OF THE YEAR. Residential fires and fire deaths are most frequent during winter months when heating systems play a dominant role. Forty percent of all deaths occur from December through February (Figure 42).



Source: NFIRS

Figure 42. Month of Year of 1994 Residential Fires and Fire Deaths

DAY OF THE WEEK. The incidence of residential fires is uniformly spread over the entire week, but one-third of all deaths occur on the weekend when a large portion of the populace is at home (Figure 43). The leading causes of residential fires—cooking and heating—are generally unaffected by the day of the week.

Source: NFIRS

Figure 43. Day of Week of 1994 Residential Fires and Fire Deaths

ONE- AND TWO-FAMILY HOMES

One- and two-family homes are where two-thirds of the people in the United States reside. The fire profile, therefore, is similar to that for residences as a whole. Manufactured housing (mobile homes) is included in the profiles for one- and two-family homes unless otherwise noted. A separate discussion on manufactured housing is included toward the end of this section. Data on residential garage fires are also treated separately at the end of this section.

Overview of Trends

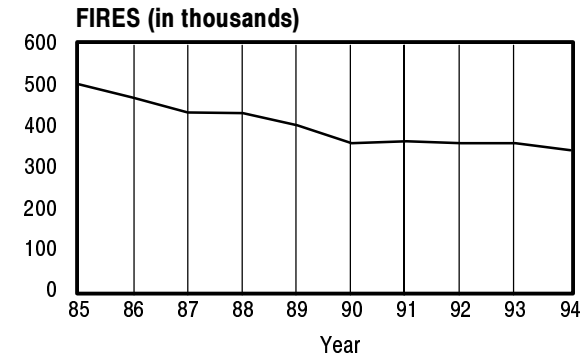
Figure 44 shows the numbers of fires, deaths, injuries, and adjusted dollar loss for single-family dwellings from 1985 to 1994. Fires and deaths steadily declined, with the 10-year trend at or above 32 percent. Dollar losses also declined, by 15 percent. Injuries have remained virtually level.

Because the number of fires has dropped faster than injuries or dollar loss, the statistics per fire are getting worse. One reason for this is that the ever-increasing number of smoke detectors detects fires in the early stages. Fires that are detected early are often extinguished before they are reported to the fire department, and so the number of reported fires decreases. When detectors are not present, the fire burns longer before detection and does more damage. This situation results in fires attended by fire departments being, on average, more serious.

When Fires Occur

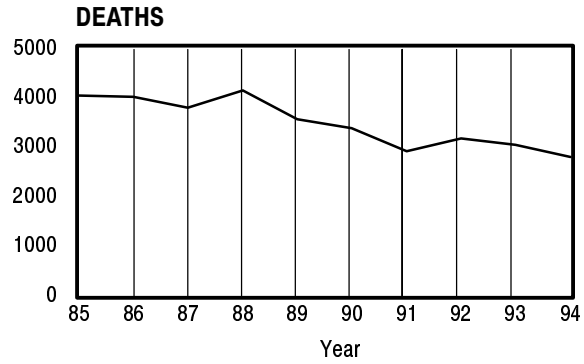
TIME OF DAY. Figure 45 shows that fires and injuries in one- and two-family dwellings are highest between 5:00 and 7:00 p.m., when cooking fires sharply increase. Fire deaths, on the other hand, peak late at night and in the early morning hours. This result is often caused by careless smoking fires that smolder for several hours and then rapidly increase in smoke production and open flames. Also, the early morning hours are when people are in deep (REM) sleep so they do not awake in time to escape. Dollar loss is fairly uniform throughout the day with peaks at 1:00–2:00 a.m. and 2:00–3:00 p.m. and nadirs at 6:00–8:00 a.m.

MONTH OF THE YEAR. Fires and fire deaths in one- and two-family homes peak in mid winter, when heating fires add to the other types of year-round fires (Figure 46).



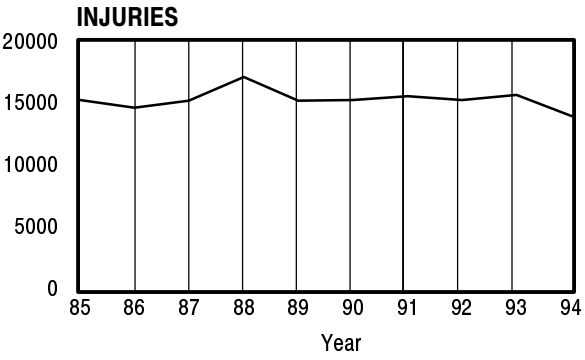
1985	501.5	1990	359.0
1986	468.0	1991	363.0
1987	433.0	1992	358.0
1988	432.0	1993	358.0
1989	402.5	1994	341.0

10-Year Trend = –32.3%



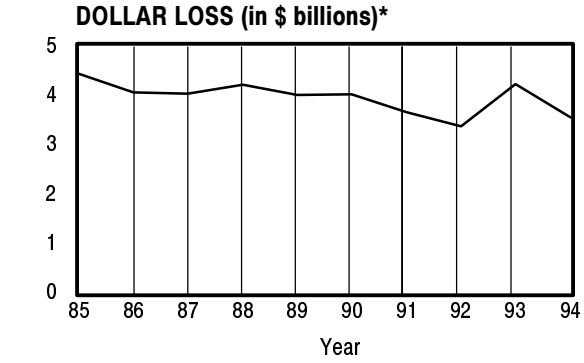
1985	4,020	1990	3,370
1986	4,005	1991	2,905
1987	3,780	1992	3,160
1988	4,125	1993	3,035
1989	3,545	1994	2,785

10-Year Trend = –32.6%



1985	15,250	1990	15,250
1986	14,650	1991	15,600
1987	15,200	1992	15,275
1988	17,125	1993	15,700
1989	15,225	1994	14,000

10-Year Trend = –2.8%



1985	$4.4	1990	$4.0
1986	4.1	1991	3.7
1987	4.0	1992	3.4
1988	4.2	1993	4.2
1989	4.0	1994	3.5

10-Year Trend = –15.0%

*Adjusted to 1994 dollars

Sources: NFPA Annual Surveys and Consumer Price Index

Figure 44. Trends in One- and Two-Family Dwelling Fires and Fire Losses

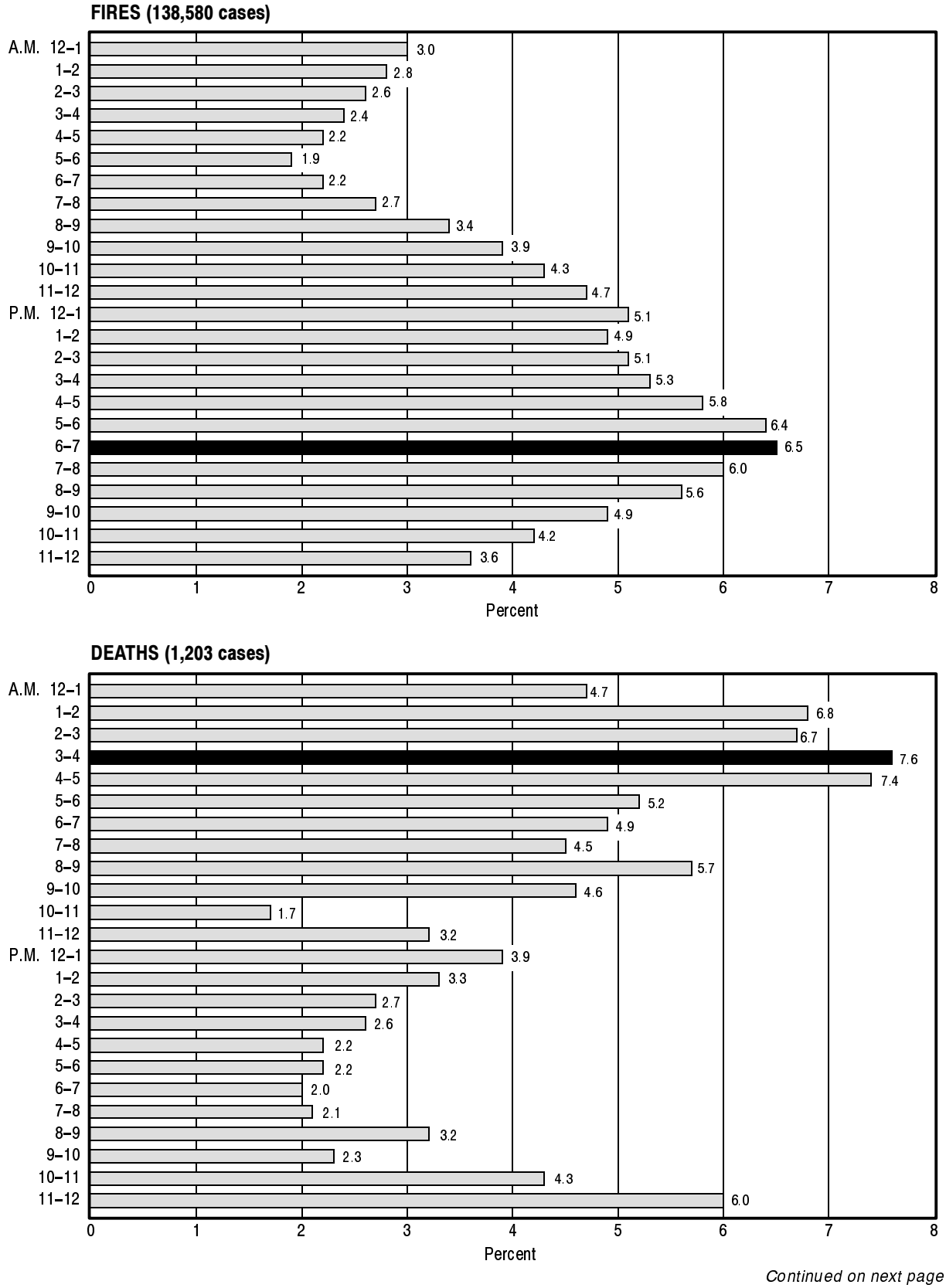


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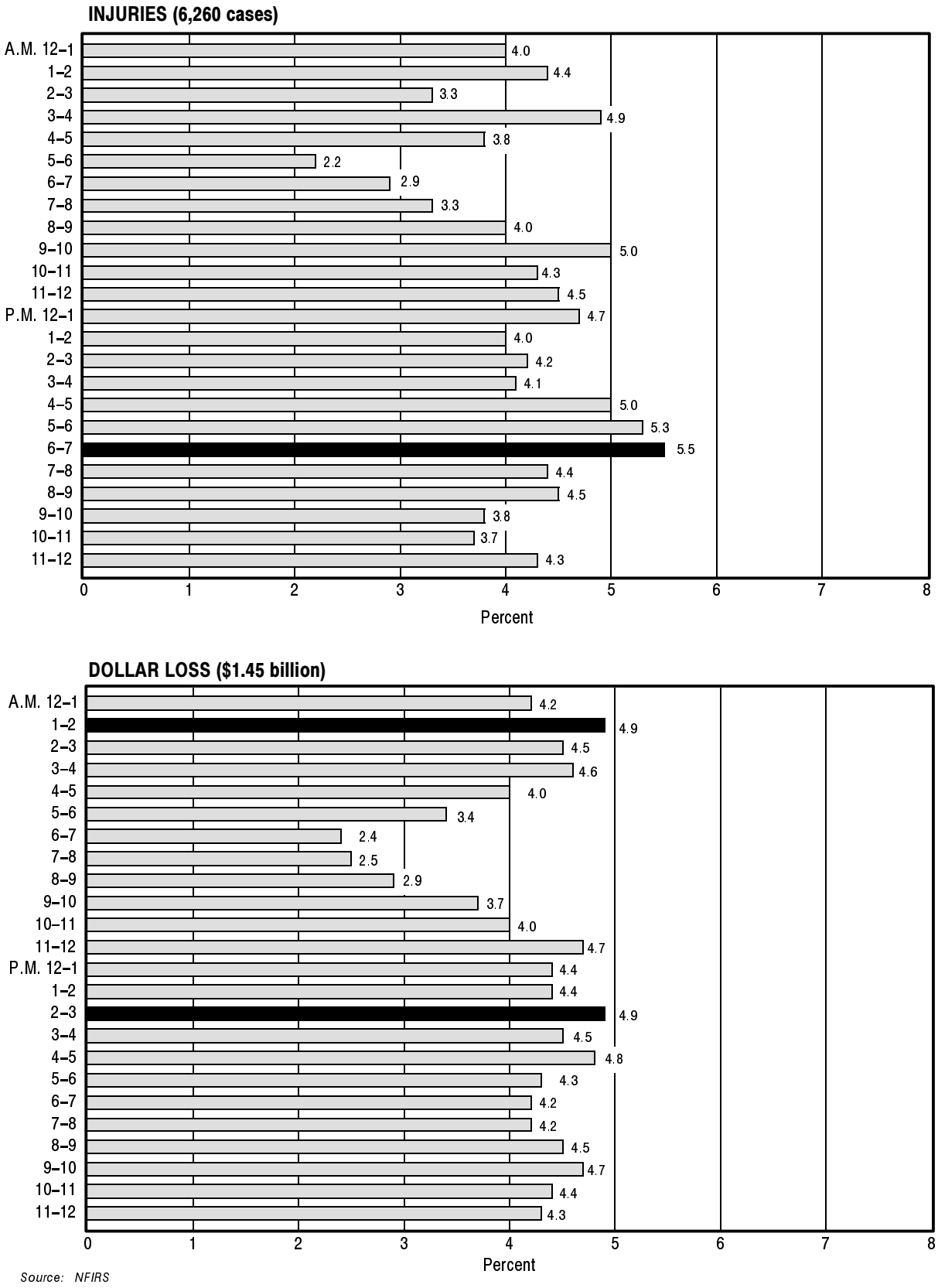
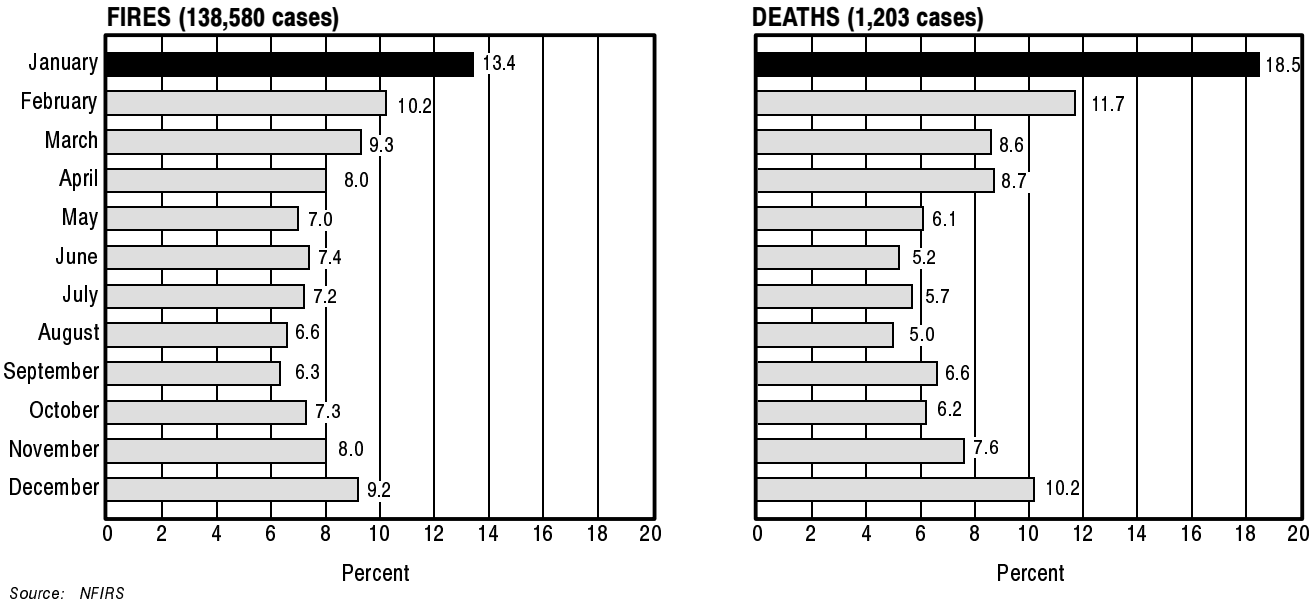
Figure 45. Time of Day of 1994 One- and Two-Family Dwelling Fires and Fire Losses



Source: NFIRS

Figure 45. Time of Day of 1994 One- and Two-Family Dwelling Fires and Fire Losses (cont'd)



Source: NFIRS

Figure 46. Month of Year of 1994 One- and Two-Family Dwelling Fires and Fire Deaths

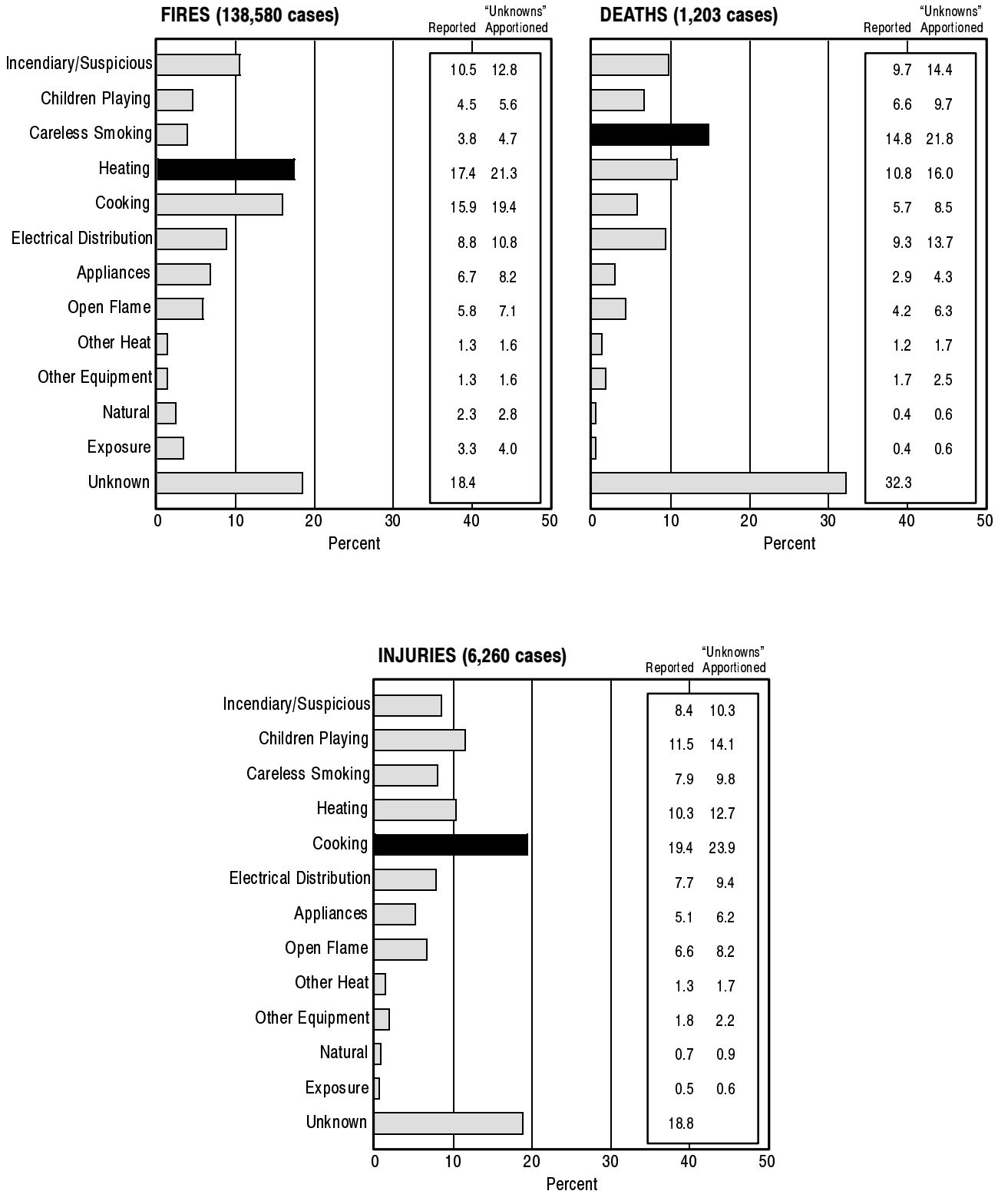
Causes

Although cooking is the overall leading cause of residential fires, heating is the leading cause of fires in one- and two-family dwelling, at 21 percent (Figure 47). Cooking at 19 percent and arson at 13 percent are the next two leading causes. That heating rather than cooking is the leading cause of fires is in part due to the role of the one-and two-family homeowner as chief maintenance officer. In the other residential property types, this role tends to be handled by professionals. The difference between heating and cooking fires has narrowed to less than 2 percentage points in 1994, most likely because the use of wood stoves and kerosene heaters has diminished over the past 10 years.

The leading cause of death is careless smoking, as in all NFIRS years, at 22 percent. This is down 24 percent from 1990 and 28 percent from 1985. Most of the careless smoking deaths come from cigarettes dropped on upholstered furniture or bedding, often by someone who has been drinking. Heating is the second leading cause of death at 16 percent and arson is third at 14 percent. These three causes account for over half of the total deaths.

For injuries, cooking is first at 24 percent. The most common cooking fires result from unattended cooking, when oil or grease catches fire, and from the ignition of loose clothing. Children playing is second at 14 percent and heating is third at 13 percent. These profiles are similar to the 1985 and 1990 causes.

Because heating is the leading cause of fires, Figure 48 examines the types of heating equipment involved in ignition of the heating fires. The largest group, nearly one-third of the total, are those from fixed or stationary area heating units, which includes baseboard units, wood heating stoves, and heating units mounted in walls. Second most common are chimney fires, especially those



Source: NFIRS

Figure 47. Causes of 1994 One- and Two-Family Dwelling Fires and Fire Casualties

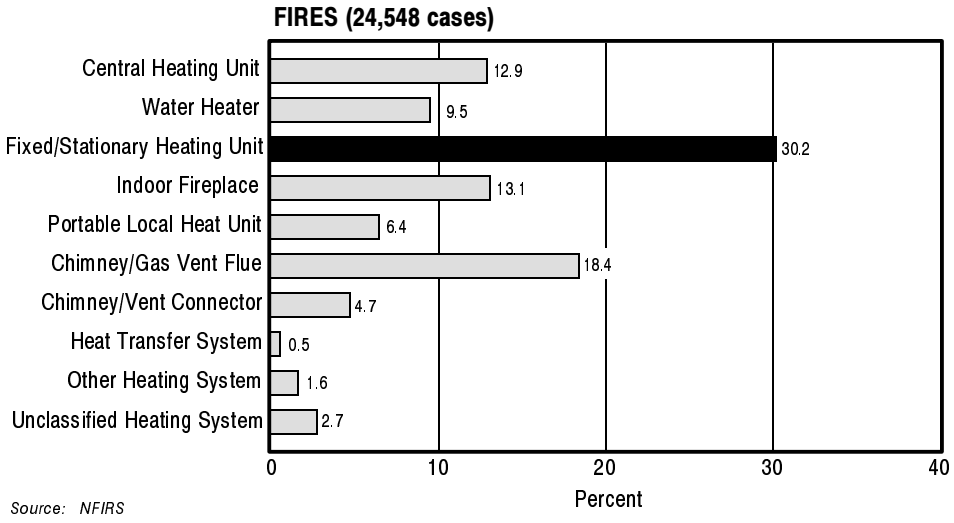


Figure 48. Types of 1994 One- and Two-Family Dwelling Heating Fires

from creosote accumulation. Third most frequent are fires associated with indoor fireplaces. Central heating units, water heaters, and portable heaters are also significant, but represent smaller parts of the problem in terms of number of fires.

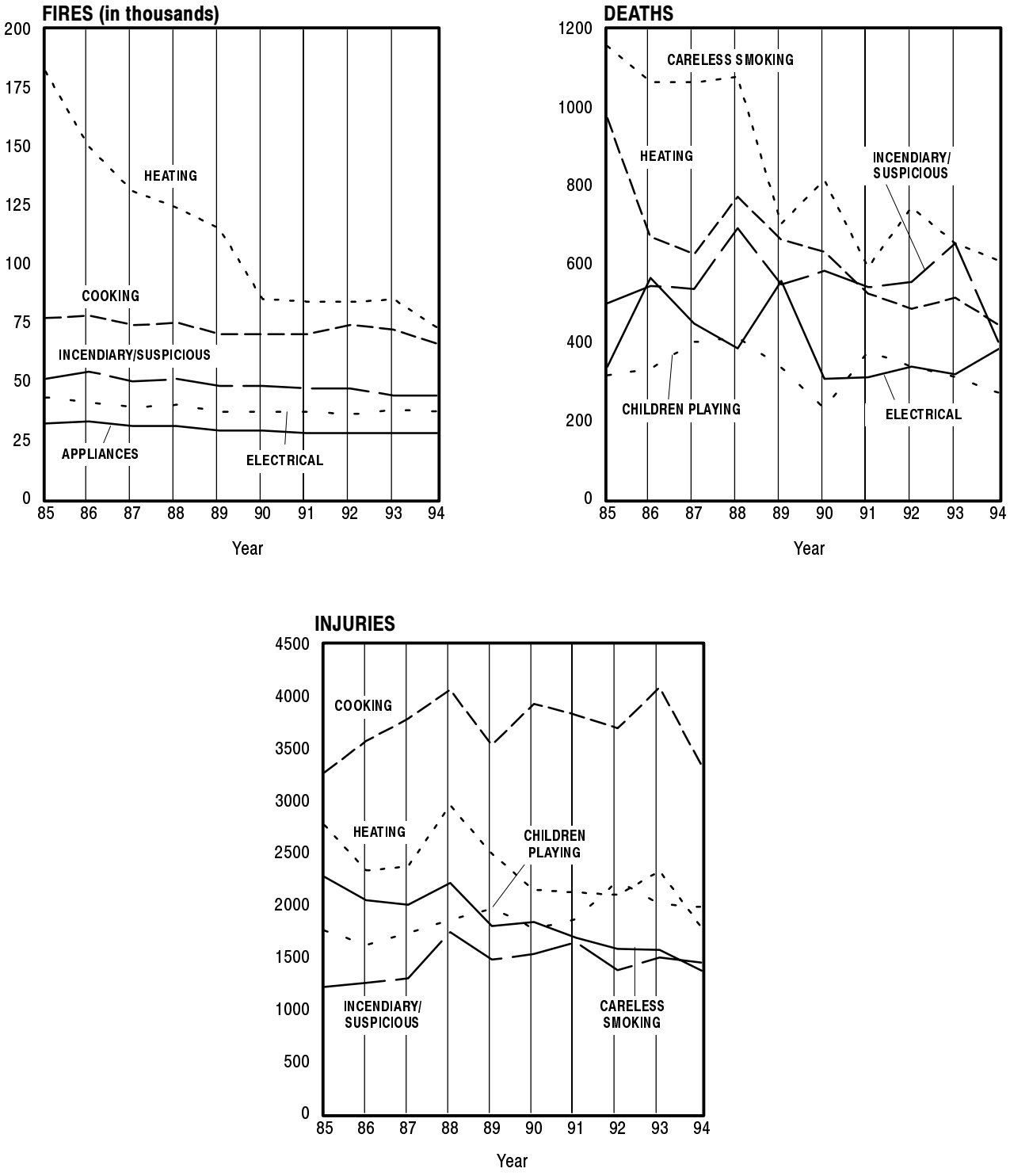
Trends in Causes

The rank order of the leading five causes of one- and two-family dwelling fires has not changed over the 10-year period 1985–1994, as shown in Figure 49. The most dramatic change is the 62 percent drop in heating fires. Careless smoking fires dropped by 45 percent (not among the top five leading causes).

Smoking deaths, however, dropped 51 percent between 1985–1995, although it continues as the leading cause of fire deaths.[6] Heating deaths dropped 48 percent over this period, but were the second leading cause until 1994. Arson deaths dropped sharply from 1993 to 1994, but still remained at third. Electrical distribution peaked in 1986 and again in 1989 but dropped to 1985 levels in 1993.

Cooking has been the leading cause of fire injuries in all 10 years by a wide margin. There is little difference in 1994 cooking injuries from those in 1985. Heating and careless smoking injuries have dropped sharply, by 27 and 37 percent, respectively. Injuries caused by children playing fires are have increased 25 percent.

[6] In 1993, arson and smoking tied at 653 for the leading cause of dwelling fire deaths.



Note : Data for all 12 causes are provided in Appendix B, Table B–2.

Sources: NFIRS and NFPA Annual Surveys

Figure 49. Trends in Leading Causes of One- and Two-Family Dwelling Fires and Fire Casualties

Area of Home

To help people visualize the fire problem more personally, it is useful to describe it in terms of where different types of fires occur in the home and what types of fires occur in each room. Figure 50 shows the rooms or areas of origin for fires, deaths, and injuries in one- and two-family homes in 1994. There is little change from 1990 in the overall rankings.

Twice as many fires occur in the kitchen than in any other area, most obviously those associated with cooking. The second most common location is the bedroom or sleeping area. Children playing, careless smoking, and intentionally set fires are the three most common fire causes here. Chimney fires, third place, often result from creosote buildup that ignites when the chimney has not been cleaned often enough or well enough. Lounge areas (living rooms and family rooms) are fourth, with heating fires and careless smoking as the primary causes.

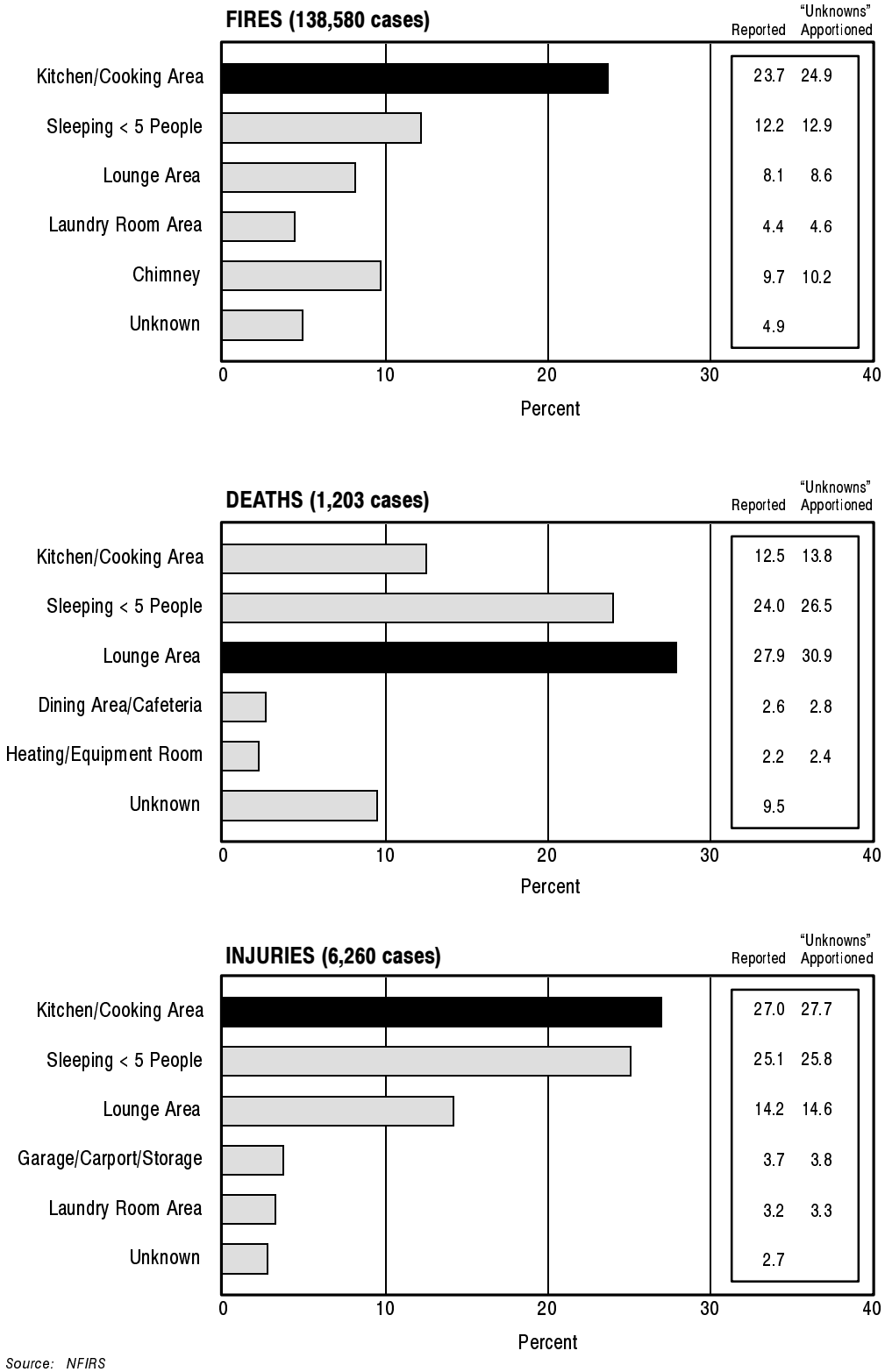
Garage/storage areas are not shown as one of the leading areas, but they actually are more significant than implied. Because of a quirk in the NFPA 901 standard for reporting fires, many fires in residential garages are not included with residential fires but rather are in a separate category under storage properties.[7] If these storage/garage fires were counted, the total number of fires in dwellings would increase by about 5 percent. There were 17,100 such garage fires in 1994. This portion of the residential fire problem is sometimes overlooked. A fuller portrait of garage fires is presented later in this section.

In one- and two-family dwellings, more than half of all deaths occur in lounge areas and bedrooms, possibly because people fall asleep smoking on upholstered furniture. (More die from smoking on furniture than from smoking in bed.) For injuries, the kitchen is most common because of the large number of burns associated with cooking. Sleeping areas rank a close second.

Slicing the problem a slightly different way, Tables 7, 8, and 9 show the most common rooms for each of the leading causes of fires, fire deaths, and injuries in one- and two-family dwellings. For heating fires, the chimney accounts for 44 percent of the fires and heating equipment areas for another 13 percent. A number of cooking fire appeared on exterior balconies and porches, presumably from grills and barbecues. Arson fires in the home had the highest frequencies of occurrence in bedrooms and lounge areas. Electrical fires were most frequently reported in kitchens, but large numbers were also in ceilings, bedrooms, and laundry rooms.

Careless smoking deaths occur most often in lounge areas, often where the intoxicated victims fall asleep on upholstered furniture, and in bedrooms, where the cigarette ignites the bedding material. Together, these two rooms account for about 80 percent of smoking-related deaths. Heating fire deaths most often are from fires started in bedrooms and second most often in lounge areas. Portable

[7] In the version of the 1976 NFPA 901 reporting standard that is used in the National Fire Incident Reporting System, all residential garages were to be reported under storage properties. In later versions (e.g., NFPA 901, *Uniform Coding for Fire Protection*, 1981 and 1986), only detached garages are included in this category. Since not all reporting firefighters know that the old definition holds for NFIRS, and some never knew, there is some inconsistency in reporting these fires. The standard is under discussion for change in the future.



Source: NFIRS

Figure 50. Leading Rooms of Origin of 1994 One- and Two-Family Dwelling Fires and Fire Casualties

Table 7. Leading Rooms of Origin by Cause for 1994 One- and Two-Family Dwelling Fires

Area of Home	Leading Causes				
	Heating	Cooking	Arson	Electrical Distribution	Appliance
Lounge	2,743 11.4%	45 0.2%	1,827 12.6%	1,373 11.2%	506 5.5%
Sleeping Under 5	937 3.9%	90 0.4%	2,541 17.5%	2,268 18.5%	1,040 11.3%
Kitchen/Cooking		20,877 95.0%	1,240 8.5%	1,147 9.4%	1,362 14.8%
Laundry Room					3,683 39.9%
Garage/Carport/Vehicle Storage		85 0.49%	679 4.7%		464 5.0%
Chimney	10,474 43.5%				
Heating Equipment Area	3,124 13.0%				
Exterior Balcony/Open Porch		231 1.1%	776 5.3%		
Crawl Space	760 3.2%				
Ceiling/Roof				1,109 8.3%	
Exterior Wall				693 5.7%	
All NFIRS Dwelling Fires	24,066	21,986	14,532	12,241	9,229

Note: For each cause, the five most common rooms or areas of origin reported are shown. Data here are NFIRS raw counts, *not* national estimates. Percentages shown are column percentages (e.g., percentages of heating or cooking fires, not percentages of lounge fires).

Source: NFIRS

and fixed space heaters play a big role here. Most arson fire deaths occur in lounge or sleeping areas. Electrical distribution fire deaths are most often in lounge areas. More than half of children playing fire deaths occur in bedrooms.

Cooking fire injuries are obviously almost all from fires in the kitchen. As with deaths (and not coincidentally with fires), over half of children playing fire injuries occurred in bedrooms. Parent and care providers need to be particularly vigilant in the supervision of young children. Heating fire injuries occur almost equally in heating equipment areas and lounge areas (which include most fireplaces). Arson fire injuries occur in a variety of places, but many of these fires occur in lounge or sleeping areas. Smoking fire injuries occur predominately in bedrooms.

Table 8. Leading Rooms of Origin by Cause for 1994 One- and Two-Family Dwelling Fire Deaths

Area of Home	Leading Causes				
	Smoking	Heating	Arson	Electrical Distribution	Children Playing
Hallway		10 7.7%			
Lounge	87 48.9%	24 18.5%	26 22.2%	24 21.4%	25 31.7%
Sleeping Under 5	53 29.8%	36 27.7%	26 22.2%	18 16.1%	40 50.6%
Sleeping Over 5					4 5.1%
Dining	6 3.4%		5 4.3%		4 5.1%
Kitchen/Cooking	13 7.3%	8 6.2%	5 4.3%	9 8.0%	
Garage/Carport/Vehicle Storage			5 4.3%		
Heating Equipment Area		18 13.8%			
Exterior Balcony/Open Porch			6 5.1%		
Crawl Space				6 5.4%	
Ceiling/Roof				3 2.7%	
Closet					2 2.5%
Unclassified Structural Area	6 3.4%				
All NFIRS Dwelling Deaths	178	130	117	112	79

Note: For each cause, the five most common rooms or areas of origin reported are shown. Data here are NFIRS raw counts, *not* national estimates. Percentages shown are column percentages (e.g., percentages of heating or cooking fires, not percentages of lounge fires).

Source: NFIRS

Table 9. Leading Rooms of Origin by Cause for 1994 One- and Two-Family Dwelling Fire Injuries

Area of Home	Leading Causes				
	Cooking	Children Playing	Heating	Arson	Smoking
Lounge		112 15.6%	112 17.3%	98 7.4%	161 32.4%
Sleeping Under 5		418 58.3%	91 14.1%	128 9.6%	238 47.9%
Dining	6 0.5%				
Kitchen/Cooking	1,138 93.9%	32 4.5%		49 3.7%	30 6.0%
Laundry Room			4.5 7.0%		
Garage/Carport/Vehicle Storage	5 0.4%	21 2.9%	40 6.2%	17 1.3%	7 1.4%
Heating Equipment Area			113 17.5%		
Crawl Space		8 1.1%			7 1.4%
Exterior Balcony	21 1.7%				
Court/Terrace/Patio	6 0.5%				
Multilocation Use				28 2.1%	
All NFIRS Dwelling Injuries	1,212	717	647	523	497

Note: For each cause, the five most common rooms or areas of origin reported are shown. Data here are NFIRS raw counts, *not* national estimates. Percentages shown are column percentages (e.g., percentages of heating or cooking fires, not percentages of lounge fires).

Source: NFIRS

Smoke Detector Performance

In 1994, detectors were present in 50 percent of homes that had fires and 31 percent of one- and two-family homes that had fire deaths (Figure 51). There are proportionally fewer detectors in homes than in apartments that have fires, primarily because detectors are often provided by landlords and more often required by law than in single-family houses. (See page 93 for more on apartments.)

Where present, the detectors operated about half the time for both fires and fire deaths, often because the fire was too small. Detectors when present operated less often in homes than apartments, perhaps because fires are more spread out relative to the detectors and perhaps because the homeowner is solely responsible for their maintenance (e.g., battery replacement).

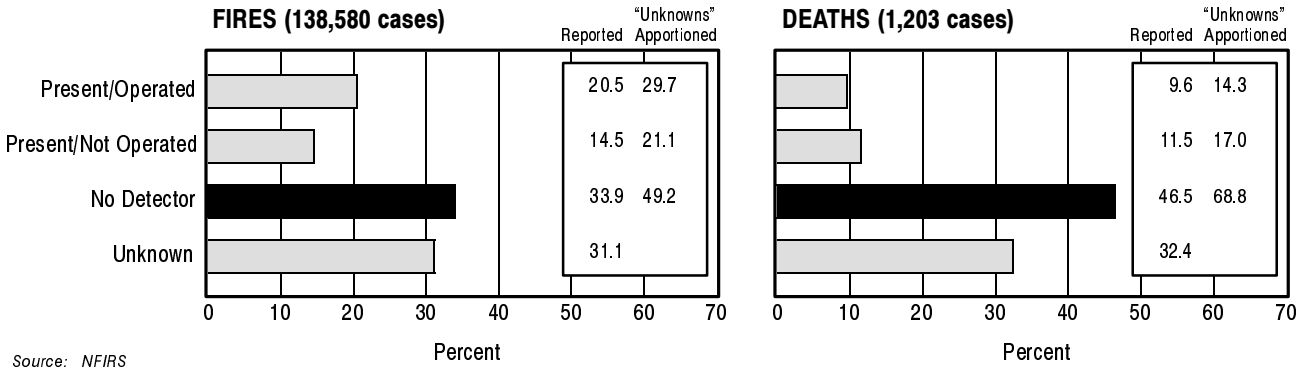


Figure 51. Smoke Detector Performance in 1994 One- and Two-Family Dwelling Fires and Fire Deaths

There was no operating detector in 49 percent of total fires and 69 percent of fire deaths. This is a modest improvement over 1990.

Sprinkler Performance

Sprinklers were present in less than 1 percent of fires or fire deaths in one- and two-family dwellings in 1994 (Figure 52). This is an insignificant amount. There were few deaths when sprinklers were present and operated, however.

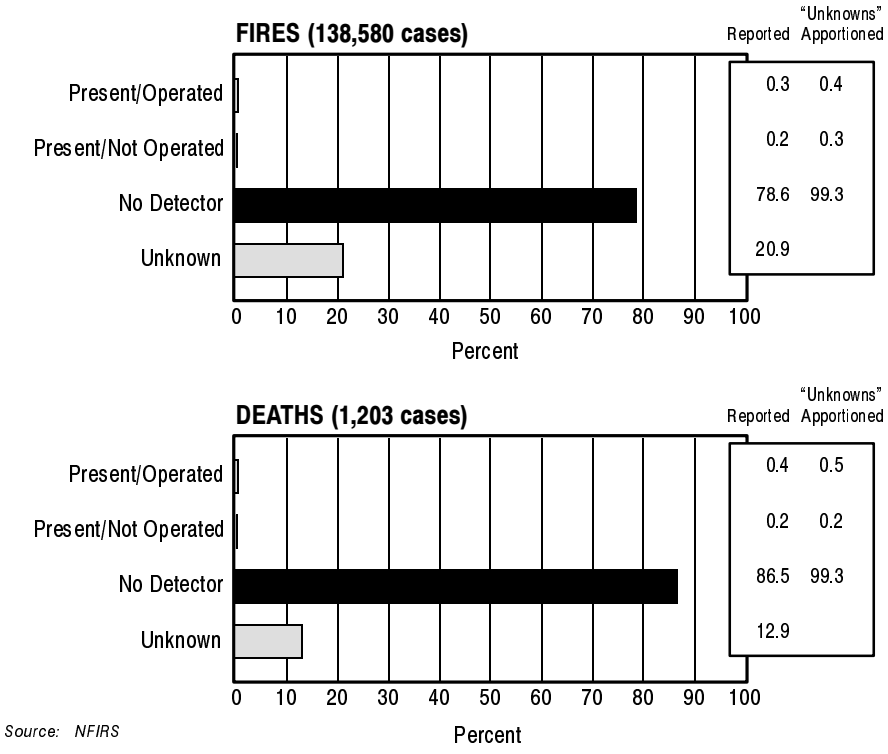


Figure 52. Sprinkler Performance in 1994 One- and Two-Family Dwelling Fires and Fire Deaths

Residential Garages

Not all residential garage fires are reported as they are supposed to be. A substantial number are reported as part of residential fires. The definition in the widely used early manual on NFPA 901 required that both attached and detached residential garages be included in the storage category. More recent versions of the 901 standard that are not in use by NFIRS require only detached garage fires to be included in the storage category. Undoubtedly, there is confusion in the field. To further complicate matters, the residential garage data often are overlooked or ignored altogether in discussions of residential fires.

Figure 53 shows the trends in fires, casualties, and losses for residential garages in fixed property use category #881, "residential parking garages." The number of fires for 1994 is rather large, about 17,100 per year or 5 percent of the total in dwellings; the 10-year trend is down 28 percent.

Because the numbers of deaths are small, there is considerable year-to-year variation. The range of from 11 to 25 deaths over the period 1985 to 1994 results in a 10-year downward trend of 15 percent. In every year, this was less than 1 percent of the fire deaths in one- and two-family dwellings.

Injuries in garage fires, which account for less than 1 percent of the injuries in dwelling fires, have trended downward sharply (36 percent). Dollar loss, about 2 percent of the total loss in dwelling fires, is down 4 percent.

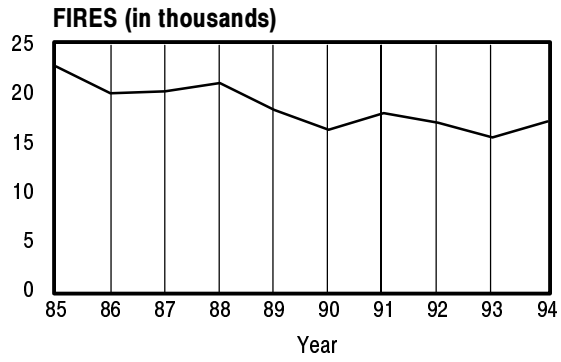
Figure 54 shows that 40 percent of deaths in garage fires for 1994 is from arson. For injuries, the leading cause is heating, with arson and other equipment second and third, respectively. In terms of sheer numbers of fires, arson leads by approximately two to one over the next leading cause—exposures to house or outside fires.

The past confusion about coding garage fires has not distorted the residential fire profiles in any significant way, but it does lead to understating the fire problem by 1 to 5 percent, depending on the measure used.

Manufactured Housing

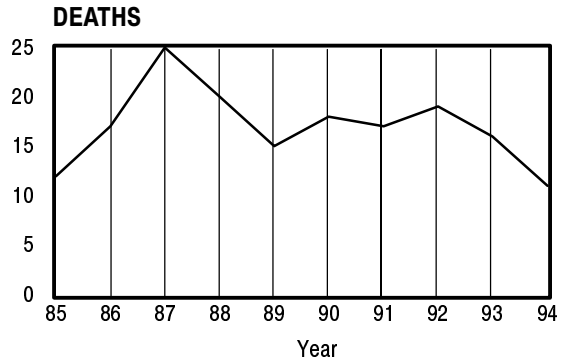
Manufactured housing is a special category of one- and two-family dwellings. Although only a small fraction of the U.S. population lives in manufactured housing, it has represented a severe problem in terms of fire fatalities in the past—double the fatality rate per fire compared to other homes. This caused the U.S. Department of Housing and Urban Development in 1976 to establish strict standards for improving the fire safety of such homes (often called "mobile homes"). The HUD standard clearly made an impact. However, the manufactured housing fire problem is still significant.

Figure 55 shows the magnitude and trends in manufactured housing fires. Despite an increase in the manufactured housing stock, fires have dropped 28 percent, deaths 29 percent, and dollar loss 37 percent over the last 10 years. Injuries over this period have remained relatively constant. These



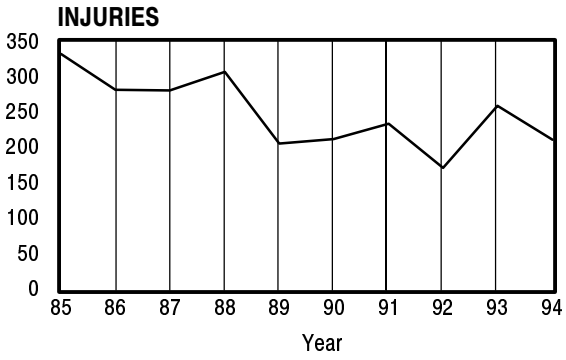
1985	22.7	1990	16.3
1986	20.0	1991	18.0
1987	20.2	1992	17.0
1988	21.0	1993	15.5
1989	18.3	1994	17.1

10-Year Trend = –27.5%



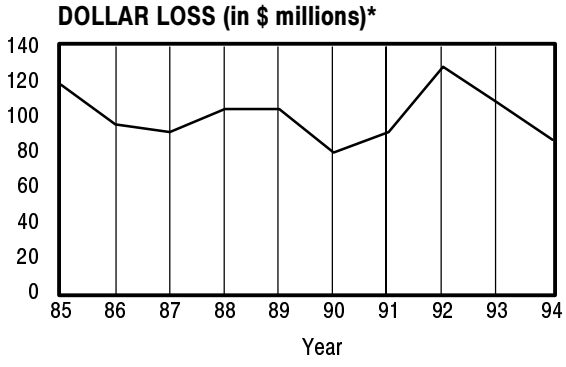
1985	12	1990	18
1986	17	1991	17
1987	25	1992	19
1988	20	1993	16
1989	15	1994	11

10-Year Trend = –15.4%



1985	332	1990	212
1986	282	1991	234
1987	281	1992	171
1988	307	1993	259
1989	206	1994	211

10-Year Trend = –36.1%



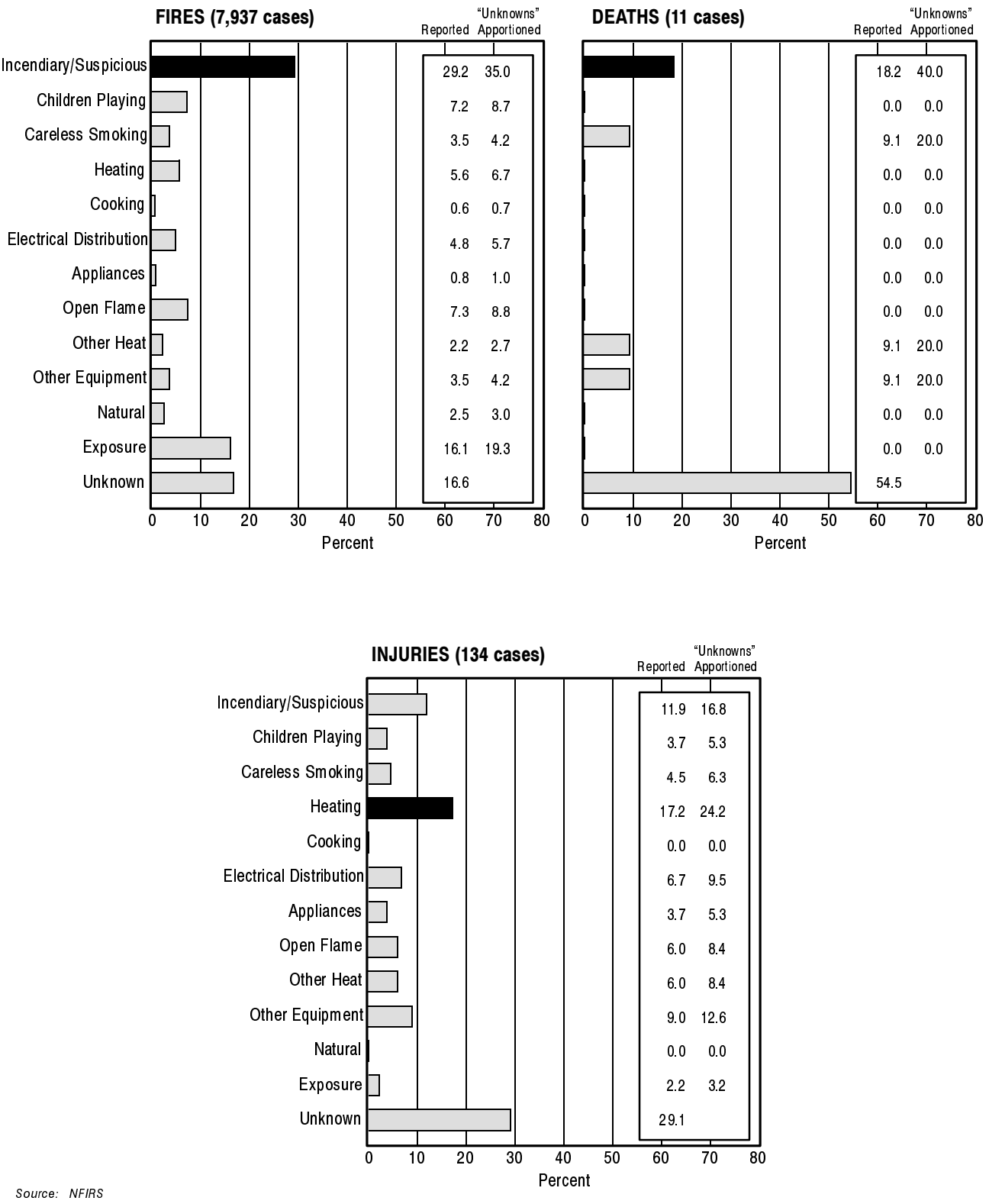
1985	$117.6	1990	$79.1
1986	95.2	1991	90.7
1987	90.7	1992	128.0
1988	104.0	1993	107.6
1989	104.0	1994	86.5

10-Year Trend = –3.8%

*Adjusted to 1994 dollars

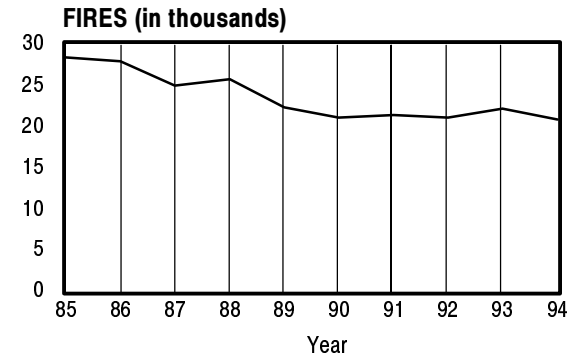
Sources: NFIRS, NFPA Annual Surveys, and Consumer Price Index

Figure 53. Trends in Residential Garage Fires and Fire Losses



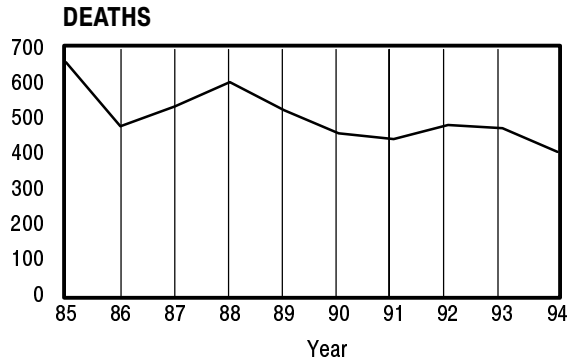
Source: NFIRS

Figure 54. Causes of 1994 Residential Garage Fires and Fire Casualties



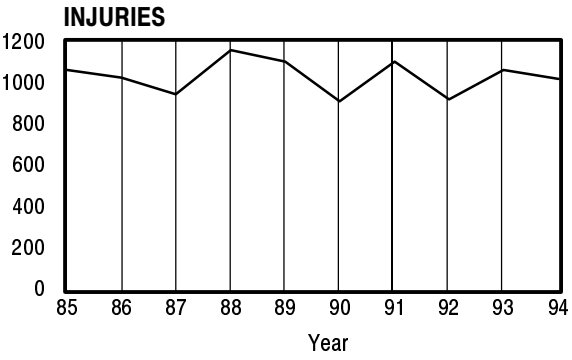
1985	28.3	1990	21.0
1986	27.9	1991	21.3
1987	24.9	1992	21.0
1988	25.7	1993	22.1
1989	22.3	1994	20.8

10-Year Trend = –28.2%



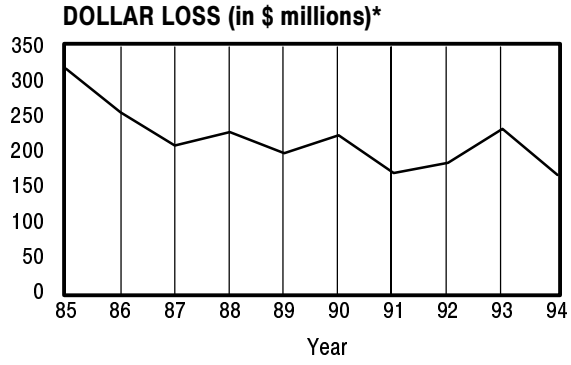
1985	657	1990	457
1986	477	1991	441
1987	532	1992	481
1988	602	1993	471
1989	521	1994	405

10-Year Trend = –28.8%



1985	1,061	1990	910
1986	1,026	1991	1,101
1987	945	1992	920
1988	1,159	1993	1,061
1989	1,103	1994	1,018

10-Year Trend = –3.3%



1985	$316.8	1990	$222.5
1986	254.8	1991	169.1
1987	208.0	1992	183.8
1988	226.9	1993	231.9
1989	197.3	1994	166.2

10-Year Trend = –36.5%

*Adjusted to 1994 dollars

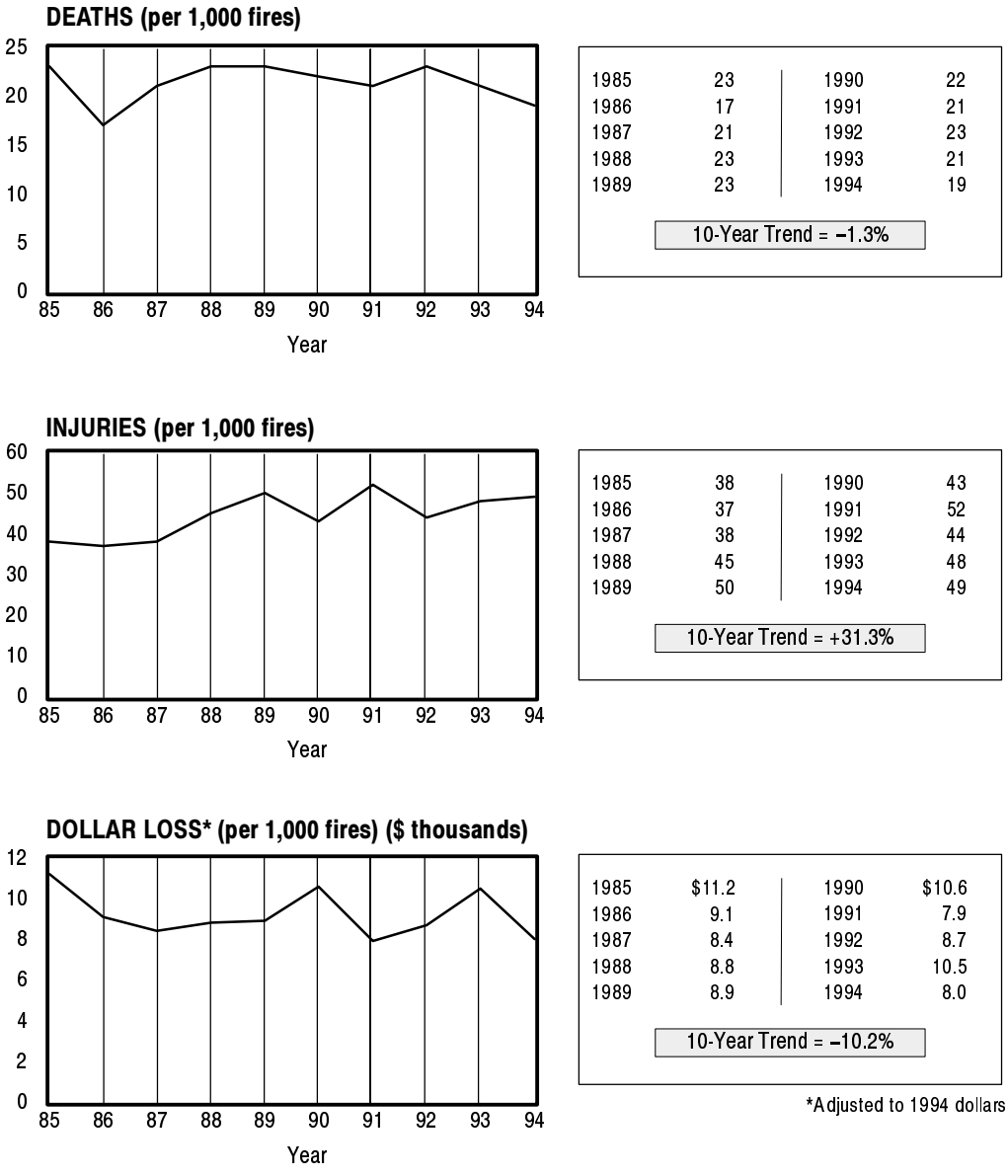
Sources: NFPA Annual Surveys and Consumer Price Index

Figure 55. Trends in Manufactured Housing Fires and Fire Losses

are all quite similar to other single-family dwelling changes during that period, except for dollar loss, which had a much sharper decline for manufactured housing.

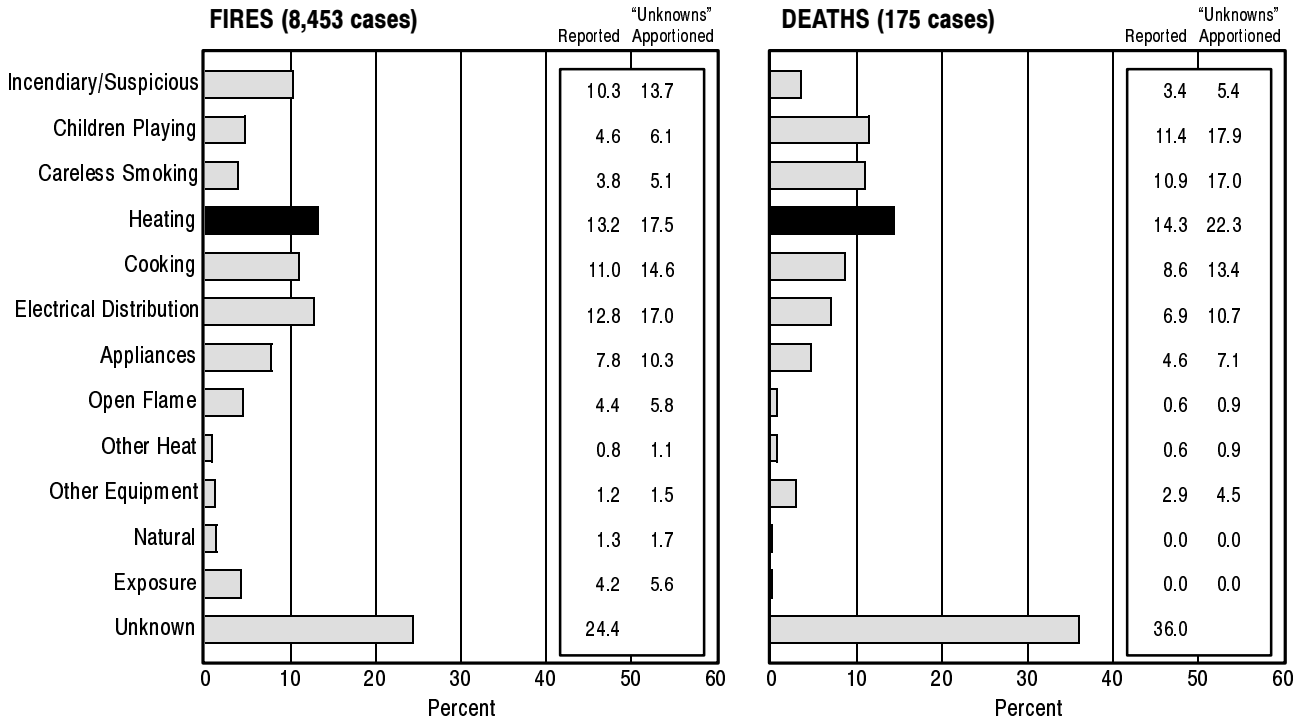
Figure 56 shows the manufactured housing trends based on 1,000 fires. Deaths remained almost constant with only a 1 percent decrease per 1,000 fires over the past 10 years. Injuries have increased significantly (31 percent), and adjusted dollar loss has decreased by about 10 percent.

The 1994 cause profile for manufactured housing fires is shown in Figure 57. Heating systems are the leading cause of fires in manufactured housing, with electrical distribution a close second. Cooking and arson were third and fourth, respectively. This cause profile is the same as that in 1990.



Sources: NFPA Annual Surveys and Consumer Price Index

Figure 56. Trends in Severity of Manufactured Housing Fire Losses



Source: NFIRS

Figure 57. Causes of 1994 Manufactured Housing Fires and Fire Deaths

For fire deaths, heating leads other causes of deaths at 22 percent. Children playing and careless smoking are second and third in manufactured housing, whereas heating and arson are so ranked in dwellings. It should be noted that deaths from smoking dropped 30 percent since 1990, from 25 to 17 percent.

APARTMENTS

The fire problem in multifamily dwellings, referred to as apartments in this report, is generally similar to that of one- and two-family dwellings with the exception of one major category: heating-related fires. Because apartments generally have central heating systems that are professionally maintained, heating-related fires from misuse and poor maintenance are significantly less than in single-family dwellings. This changes the proportions of the causes for apartments, with heating becoming less significant and the other causes moving up in importance.

Apartment buildings tend to be more regulated by building codes than single-family dwellings. Many apartments are rental properties, which may also fall under more stringent fire prevention statutes. In many communities, apartments have a significantly different socio-economic mix of residents compared to single-family dwellings. They may have more low-income families in housing projects or more high-income families in luxury high rises, or they may be centers of living for the elderly. In large cities, they may have all of these groups.

Because apartment buildings have large clusters of similar people, they can be given special attention with prevention programs based on the cause profiles of apartment buildings in different areas of the community.

Trends

Figure 58 shows the 10-year trend in apartment fire incidence, deaths, injuries, and dollar loss. Fire incidence dropped 4 percent in apartments, whereas dwelling fires dropped at nearly eight times this rate. The trend for deaths was down 26 percent, similar to that of one- and two-family dwellings. Injuries trended upwards a worrisome 51 percent, while they fell 3 percent for dwellings. Adjusted dollar losses were up by 1 percent, while dropping 15 percent in one- and two-family dwellings.

Compliance with stricter codes and the presence of detectors may be holding down the life loss in apartment fires. More detailed study of socio-economic and demographic changes over time might help explain some of the changes in fire incidence.

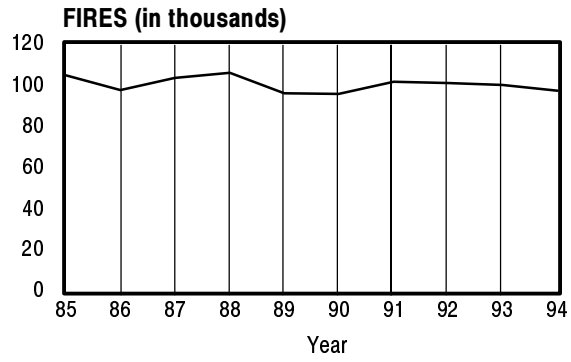
Causes

In terms of sheer numbers of reported fires, cooking in apartments is by far the most frequent cause, accounting for 40 percent of the fires. Arson is a distant second at 15 percent, and careless smoking third at 9 percent in 1994 (Figure 59).

The leading cause of deaths in apartments is careless smoking, with almost one-third of all fire deaths. Second was arson fires (21 percent), and third was children playing fires (20 percent). These three causes account for nearly three-quarters of all fire deaths in apartments; all other causes are relatively small, including heating. For fire injuries, cooking was first in 1994 at 30 percent, with arson second at 17 percent, careless smoking third at 16 percent, and children playing fourth at 12 percent. These four causes account for almost three-quarters of all injuries. There has been little change in the leading causes of fires, deaths, or injuries from the 1990 edition.

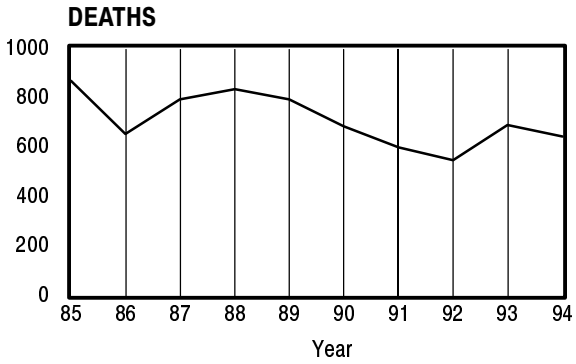
Figure 60 shows the trends in the top fire causes of apartment fires and casualties from 1985 to 1994. In terms of fire incidence, changes in occurrence of the leading causes were minimal. Arson fires were down 18 percent, although arson injuries increased 60 percent. Careless smoking fires were down 44 percent. The above data suggest that fire prevention programs aimed at apartment dwellers might emphasize the risk of careless smoking, the importance of supervising children, and the danger in leaving cooking unattended.

Careless smoking deaths dropped sharply, by 40 percent. Arson deaths reached a peak in 1989 but have experienced an overall 10-year downward trend. Children playing deaths have increased significantly since 1991. Overall, children playing deaths increased 20 percent over 1985. Some of this change may reflect more attention to defining fires as “children playing” rather than arson, but it is unlikely to account for all of the rise.



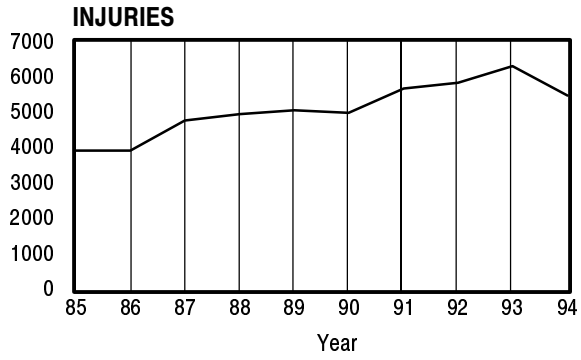
1985	104.5	1990	95.5
1986	97.5	1991	101.5
1987	103.5	1992	101.0
1988	106.0	1993	100.0
1989	96.0	1994	97.0

10-Year Trend = –4.1%



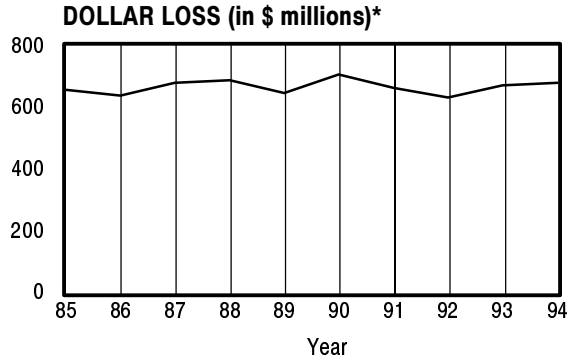
1985	865	1990	680
1986	650	1991	595
1987	790	1992	545
1988	830	1993	685
1989	790	1994	640

10-Year Trend = –25.7%



1985	3,925	1990	4,975
1986	3,925	1991	5,675
1987	4,765	1992	5,825
1988	4,950	1993	6,300
1989	5,050	1994	5,475

10-Year Trend = +51.1%



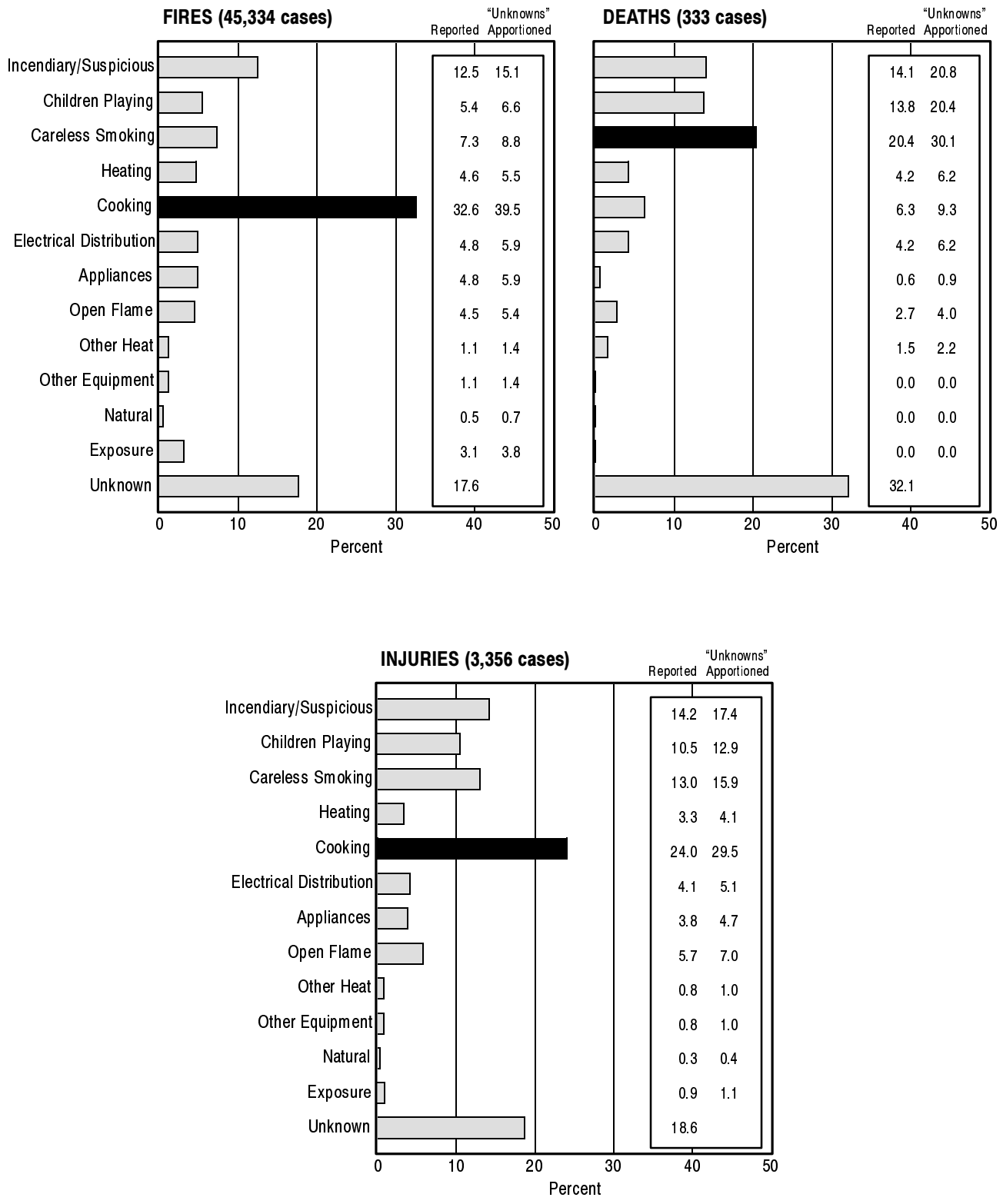
1985	$655.6	1990	$706.4
1986	638.2	1991	662.7
1987	679.7	1992	630.6
1988	686.5	1993	669.7
1989	646.6	1994	678.0

10-Year Trend = +1.4%

*Adjusted to 1994 dollars

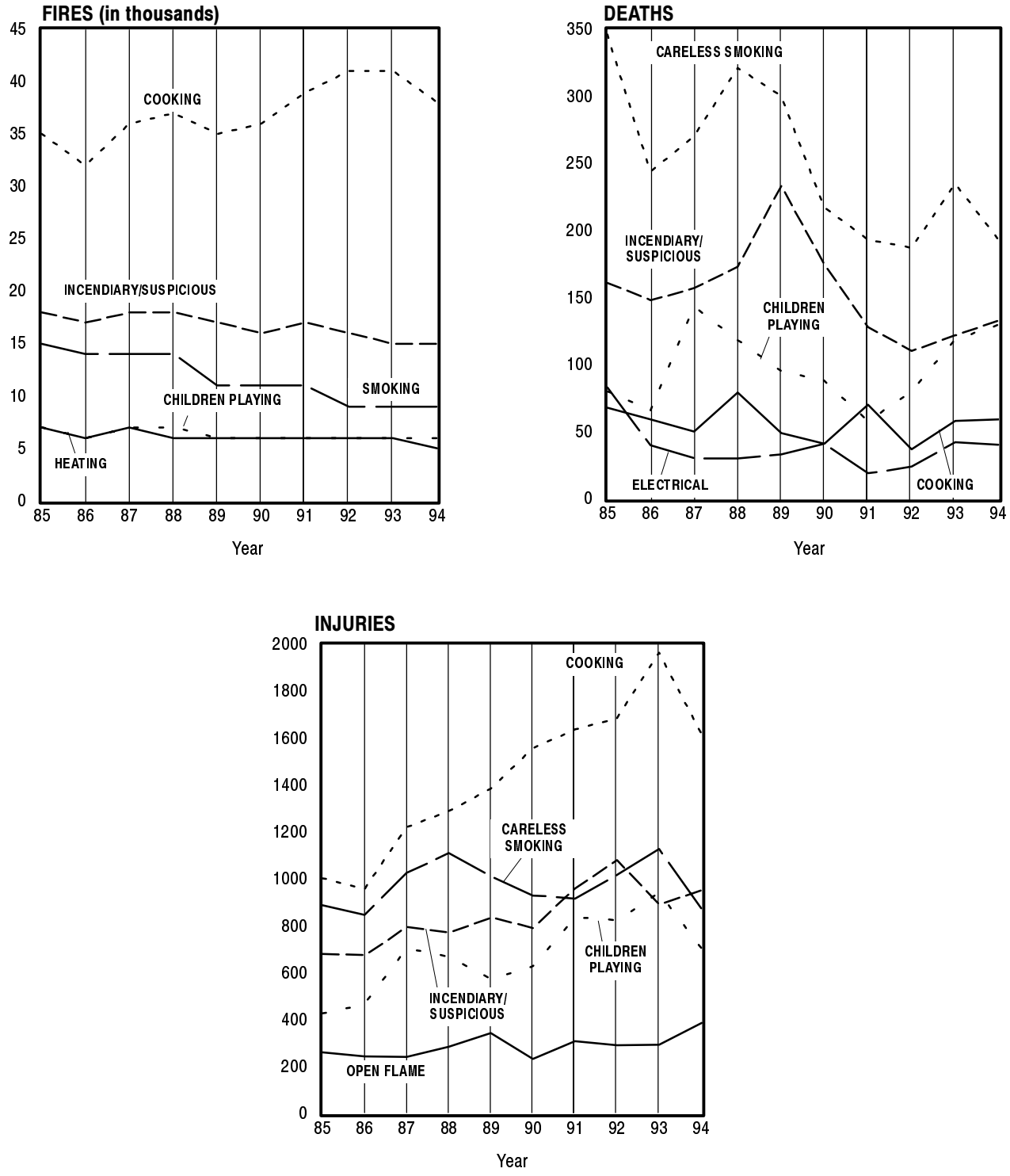
Sources: NFPA Annual Surveys and Consumer Price Index

Figure 58. Trends in Apartment Fires and Fire Losses



Source: NFIRS

Figure 59. Causes of 1994 Apartment Fires and Fire Casualties



Note: Data for all 12 causes are provided in Appendix B, Table B–3.

Sources: NFIRS and NFPA Annual Surveys

Figure 60. Trends in Leading Causes of Apartment Fires and Fire Casualties

Injuries from cooking in apartments, by far the leading cause, nearly doubled over 10 years. Arson injuries have risen 47 percent. However, children playing accounted for a sharply higher number of injuries, rising by 78 percent over the 10-year period. Careless smoking and open flame injuries have changed very little.

Smoke Detector Performance

Figure 61 shows the performance of smoke detectors in apartments in 1994. Considering all fires, detectors were present 54 percent of the time (74 percent adjusted). Detectors are more likely to be installed in apartments, where they are provided by landlords, than in dwellings, where the occupants/owners provide and maintain them.

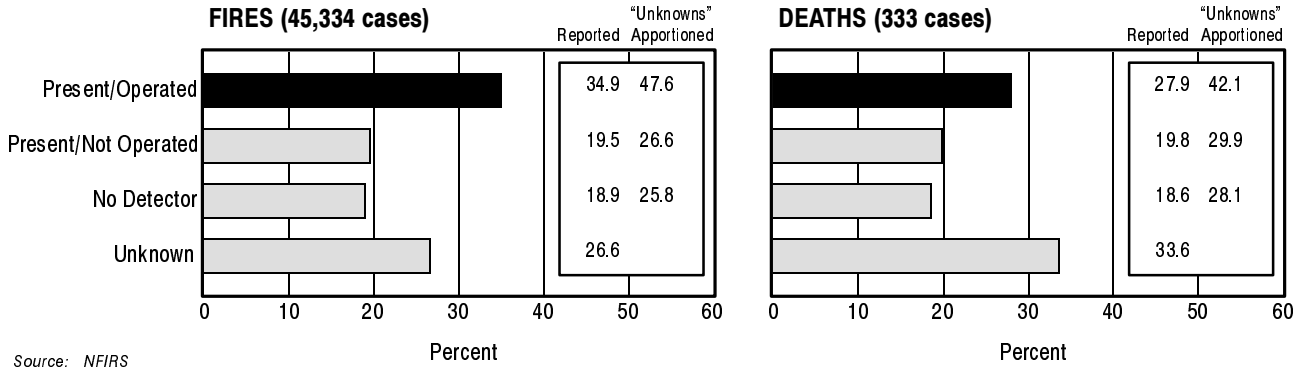


Figure 61. Smoke Detector Performance in 1994 Apartment Fires and Fire Deaths

The usage of detectors where fires occur in apartments, as well as dwellings, is considerably below the national average of over 88 percent of households having detectors according to recent national surveys. Apartment dwellers who have fires are probably less likely than average to be safety conscious and to provide and maintain detectors.

Smoke detectors in 1994 were present and operating in 28 percent (unadjusted) of fire deaths in apartments, and as high as 42 percent if only fire deaths with known detector performance are counted. Why detectors worked and people still died is a subject for further study. One possibility is that hallway detectors or detectors in other apartments operated after the victims were overcome. Also, apartments have fewer ways to escape, especially apartments on higher floors; at night, escaping from an apartment can be particularly confusing when people are awakened suddenly. This situation suggests the need to provide sprinklers in apartments and to emphasize fire prevention.

Detectors were present and did not operate in 20 percent of deaths (30 percent adjusted). This is 50 percent higher than the rate of nonworking detectors in dwellings. These statistics are unexpected as apartment detectors are more likely to be hardwired into the electrical system and professionally maintained than detectors in dwellings.

Since 1990, the presence of detectors in apartments with fire deaths has increased significantly from 39 to 48 percent. The percentage of detectors that were not working has increased (from 15 to 20 percent unadjusted).

Sprinkler Performance

There are few fire deaths being reported in apartment buildings where sprinklers were present and operating (Figure 62), but it is not known from NFIRS whether the sprinklers were in the apartment of origin. Overall, there are more sprinklers present in apartment fires than in dwelling fires, but the percentage is still small in 1994—just over 6 percent adjusted, which is only a 5 percent increase since 1990.

When Fires Occur

TIME OF DAY. Figure 63 shows the alarm times for fires, deaths, injuries, and dollar loss in apartment fires. The profiles are not as smooth as those for one- and two-family dwellings due to the smaller numbers of incidents involved.

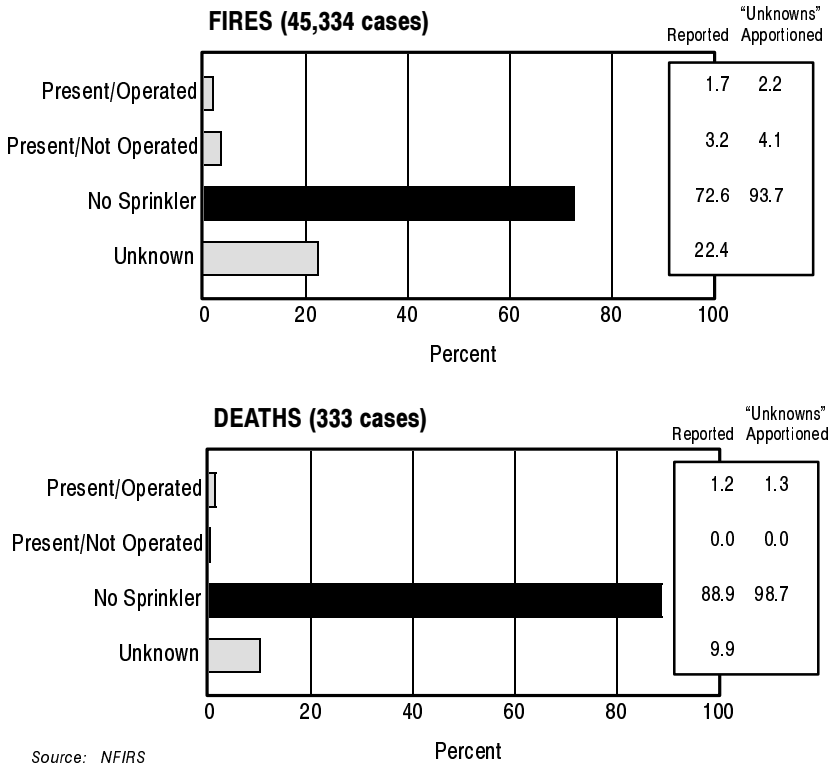


Figure 62. Sprinkler Performance in 1994 Apartment Fires and Fire Deaths

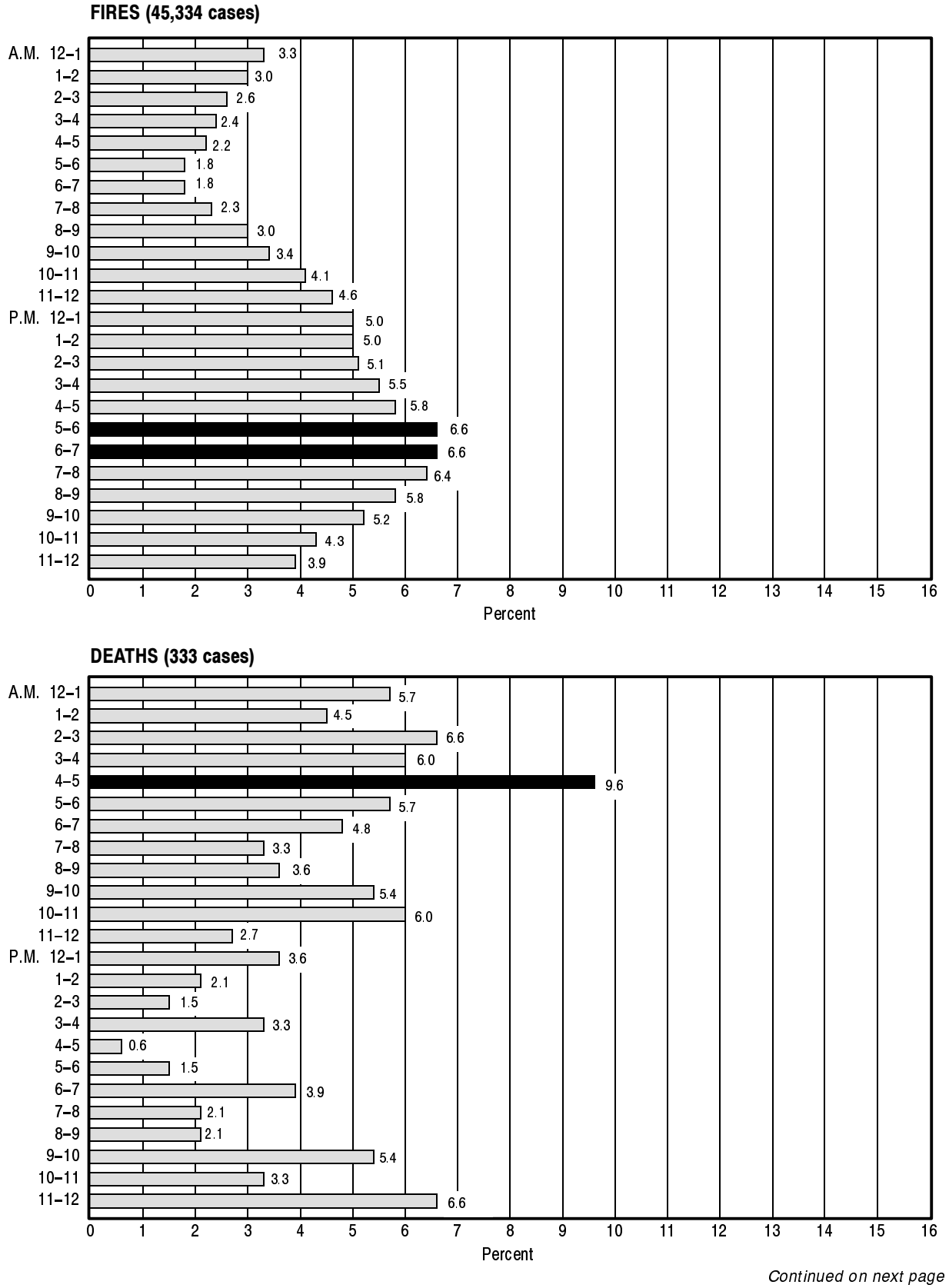


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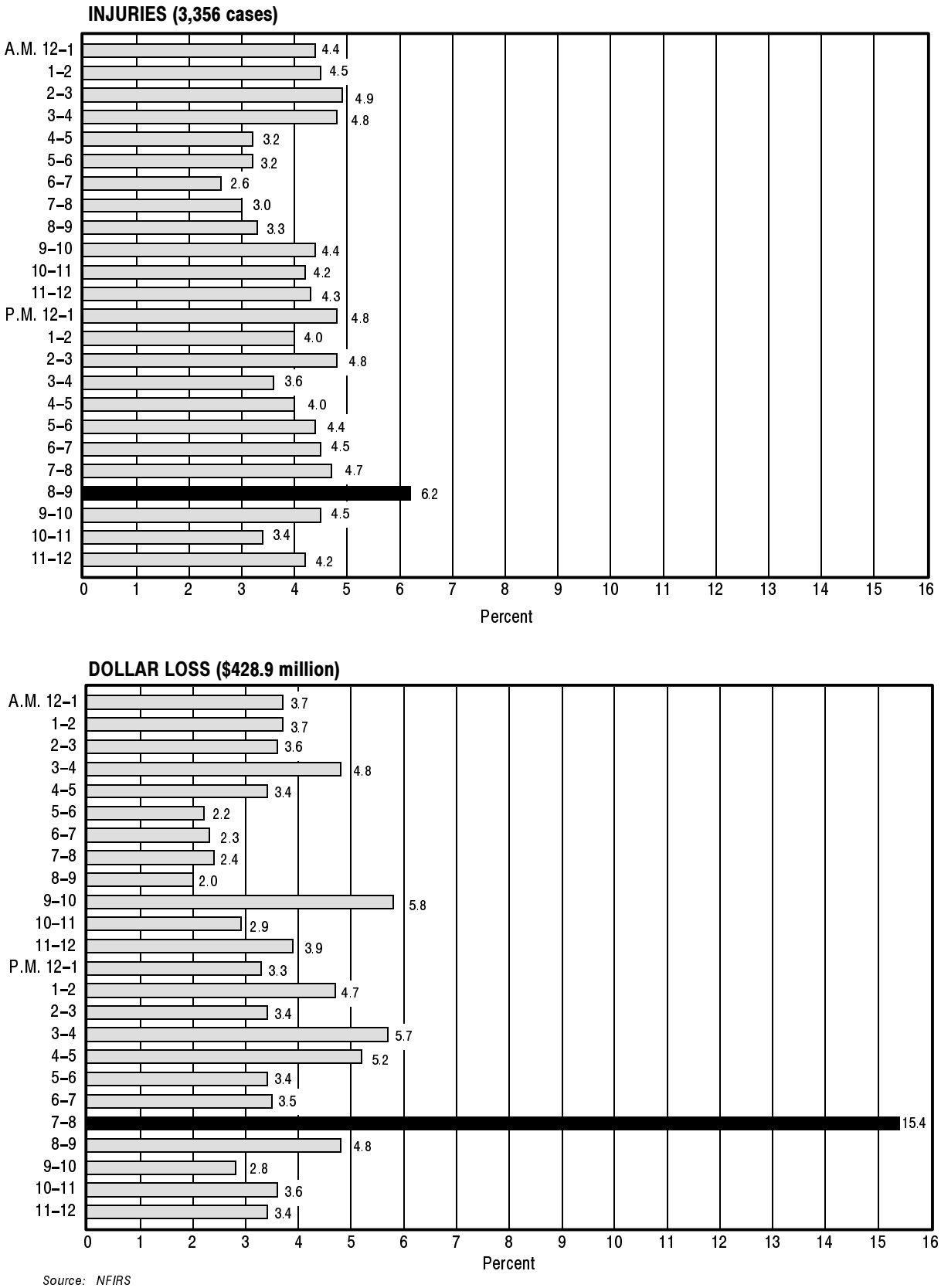
Figure 63. Time of Day of 1994 Apartment Fires and Fire Losses



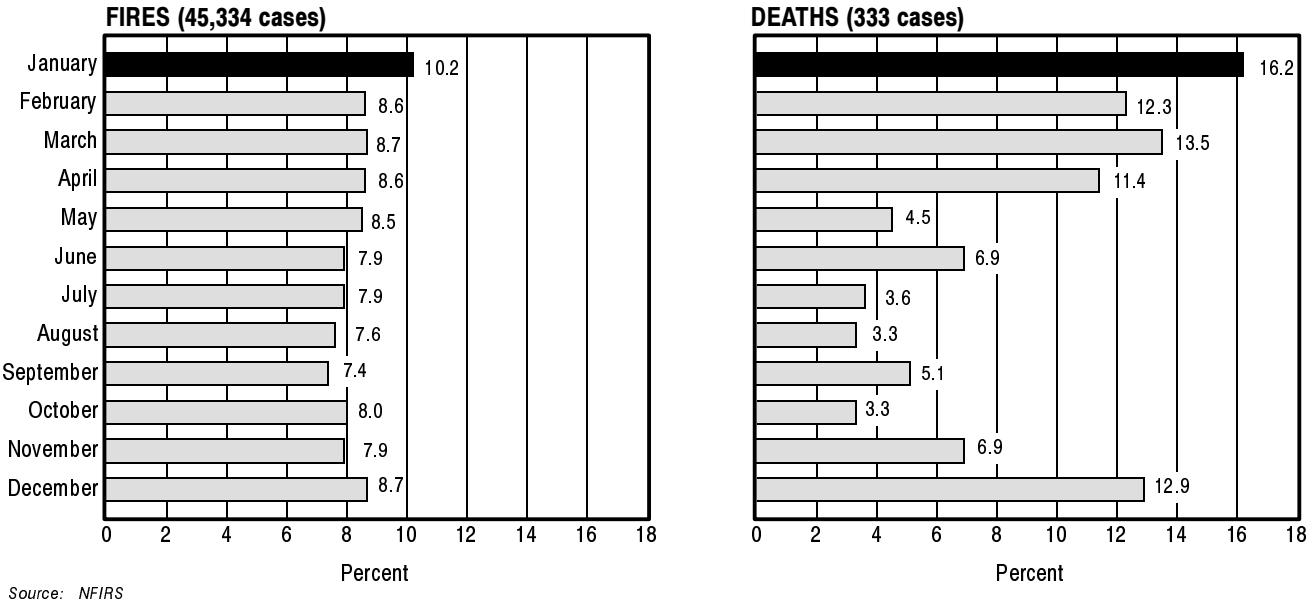
Source: NFIRS

Figure 63. Time of Day of 1994 Apartment Fires and Fire Losses (cont'd)

Apartment fires peak from 5:00 to 7:00 p.m.—the cooking period—and are at a low from 5:00 to 7:00 a.m. As is the case in one- and two-family dwellings, the late night hours are most common for fire deaths, especially those associated with latent smoldering fires from careless smoking in the 11:00 p.m. to 7:00 a.m. period. Nearly 50 percent of all deaths occur in this 8-hour period.

Injuries have less pronounced peaks, with one from 8:00 to 9:00 p.m. in 1994. Because cooking is the leading cause of injuries, this probably accounts for the evening peak. Except for the huge peak between 7:00 and 8:00 p.m. ($64 million combined loss), dollar loss is fairly uniform.

MONTH OF YEAR. Fires in apartments are more uniform throughout the year than for dwellings because of the reduced role that heating plays (Figure 64). Still, they are somewhat more common in winter than in summer, perhaps because of heating fire problems in low-income apartments and increased indoor activity such as children playing.



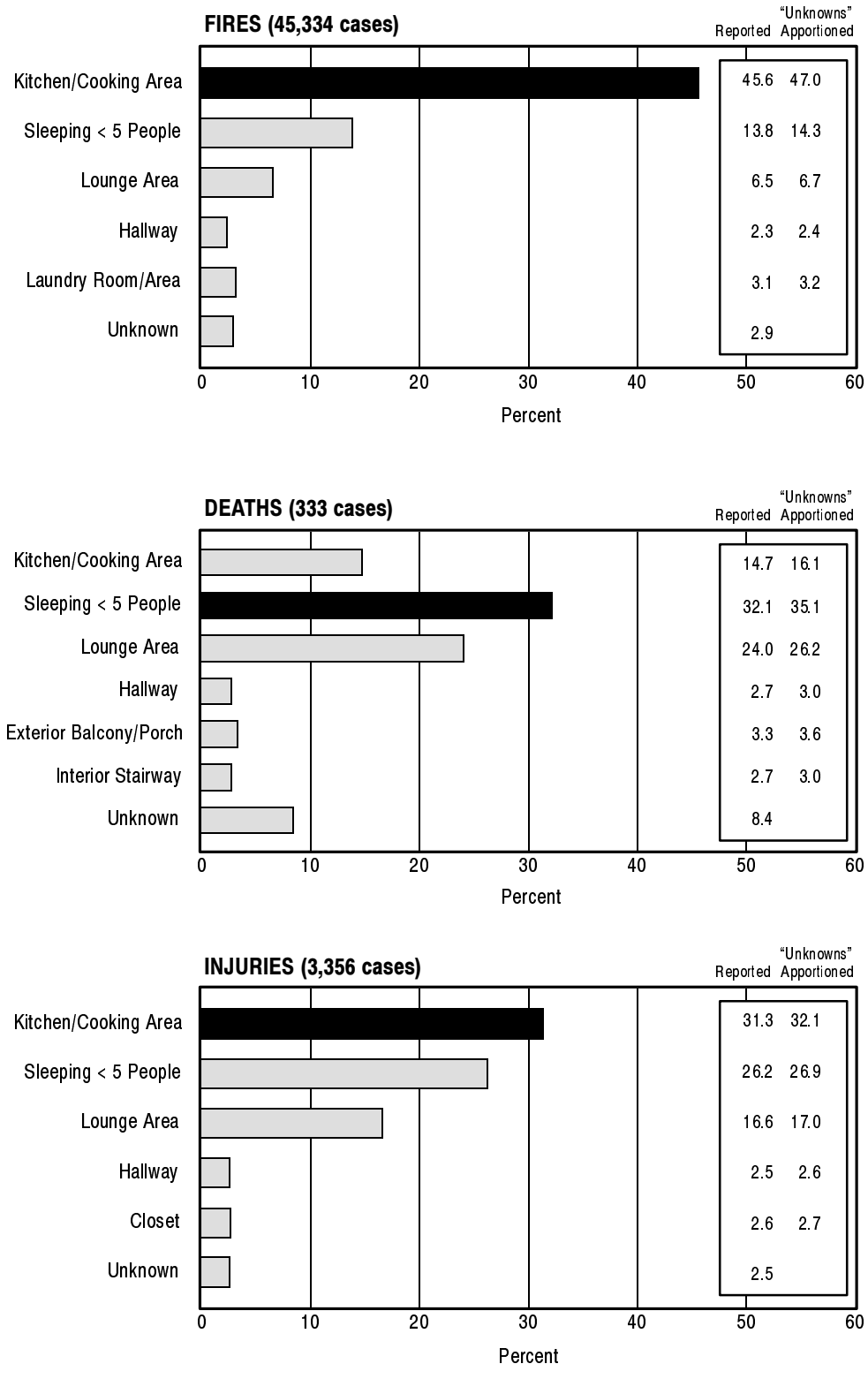
Source: NFIRS

Figure 64. Month of Year of 1994 Apartment Fires and Fire Deaths

Apartment fire deaths are much more common in the winter than in the summer, as they are for one-and two-family dwellings, even though heating is a relatively minor cause for apartment fire deaths. Clearly there are other seasonal factors in addition to heating—perhaps a greater propensity to stay at home.

Room of Origin

Figure 65 shows the leading rooms of origin of fires, deaths, and injuries in apartments. As in every year for the past 10, the kitchen is the most common place for a fire and injury because of cooking. As in dwellings, the lounge area and bedrooms are the most common place for a fatal fire to start because of smoking on upholstered furniture.



Source: NFIRS

Figure 65. Leading Rooms of Origin of 1994 Apartment Fires and Fire Casualties

Tables 10, 11, and 12 shows the leading rooms for each major cause of apartment fires, deaths, and injuries. Although the leading causes differ somewhat in apartments versus dwellings, the rooms for each cause are generally similar.

Table 10. Leading Rooms of Origin by Cause for 1994 Apartment Fires

Area of Home	Leading Causes				
	Cooking	Arson	Smoking	Children Playing	Electrical Distribution
Hallway		571 10.1%			
Interior Stairway		233 4.1%			
Lounge Area	20 0.14%	542 9.6%	744 22.5%	204 8.3%	253 11.5%
Sleeping Under 5	37 0.25%	967 17.1%	1,138 34.5%	1,464 59.4%	605 27.6%
Dining	26 0.18%				
Kitchen/Cooking	14,350 97.2%	536 9.5%	246 7.4%	149 6.0%	259 11.8%
Lavatory			119 3.6%	60 2.4%	138 6.3%
Closet				201 8.2%	83 3.8%
Trash Area/Container			189 5.7%		
Court/Terrace/Patio	30 0.20%				
All NFIRS Apartment Fires	14,759	5,661	3,303	2,466	2,196

Note: For each cause, the five most common rooms or areas of origin reported are shown. Data here are NFIRS raw counts, *not* national estimates. Percentages shown are column percentages (e.g., percentages of heating or cooking fires, not percentages of lounge fires).

Source: NFIRS

Table 11. Leading Rooms of Origin by Cause for 1994 Apartment Fire Deaths

Area of Home	Leading Causes				
	Smoking	Arson	Children Playing	Cooking	Heating
Hallway	1 1.5%	2 4.3%			2 14.3%
Interior Stairway		9 19.1%			
Laundry Room			4 8.7%		
Lounge	30 44.1%	7 14.9%	7 15.2%		7 50.0%
Sleeping Under 5	29 42.6%	5 10.6%	26 56.5%		1 7.1%
Kitchen/Cooking	3 4.4%		4 8.7%	21 100.0%	1 7.1%
Closet	1 1.5%		1 2.2%		
Supply Storage Room	1 1.5%		1 2.2%		
General Storage Area					3 21.4%
Exterior Balcony/Open Porch		8 17.0%			
All NFIRS Apartment Deaths	68	47	46	21	14

Note: For each cause, the five most common rooms or areas of origin reported are shown. Data here are NFIRS raw counts, not national estimates. Percentages shown are column percentages (e.g., percentages of heating or cooking fires, *not* percentages of lounge fires).

Source: NFIRS

Table 12. Leading Rooms of Origin by Cause for 1994 Apartment Fire Injuries

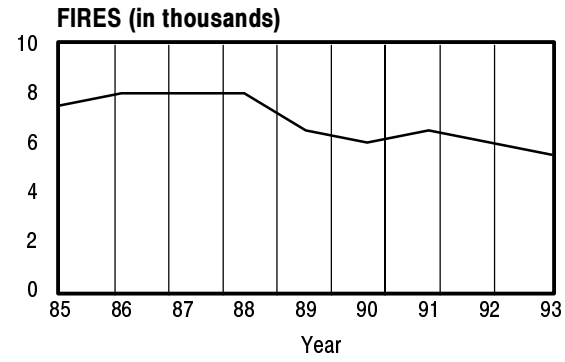
Area of Home	Leading Causes				
	Cooking	Arson	Smoking	Children Playing	Open Flame
Hallway		59 12.4%			
Interior Stairway		29 6.1%			
Lounge	5 0.6%	81 17.1%	186 42.8%	47 13.4%	51 26.6%
Sleeping Under 5		110 23.2%	157 36.1%	235 67.0%	76 39.6%
Dining	5 0.6%				
Kitchen/Cooking	784 97.3%	24 5.1%	15 3.4%	20 5.7%	15 7.8%
Wall Assembly					6 3.1%
Closet	2 0.2%		5 1.1%	17 4.8%	5 2.6%
Product Storage			6 1.4%		
Exterior Balcony	3 0.4%				5 2.6%
Incinerator Room				18 5.1%	
All NFIRS Apartment Injuries	806	475	435	351	192

Note: For each cause, the five most common rooms or areas of origin reported are shown. Data here are NFIRS raw counts, *not* national estimates. Percentages shown are column percentages (e.g., percentages of heating or cooking fires, not percentage of lounge fires).

Source: NFIRS

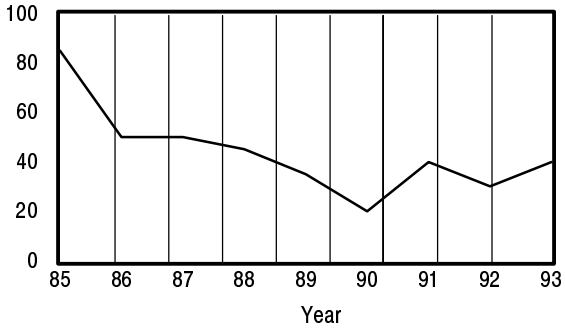
HOTELS AND MOTELS

Fires, deaths, injuries, and dollar loss in hotels and motels continued their decline from 1985 to 1993 (Figure 66). Because of the small sample sizes, the 9-year trends appear to be quite dramatic. Because of the notable improvement in the number of hotel and motel fires and fire losses—which in turn resulted in small sample sizes—NFPA no longer tabulates this residential category separately. As of 1994, hotel and motel fires are included in the other residential property category. NFIRS, however, still tabulates these fires separately.



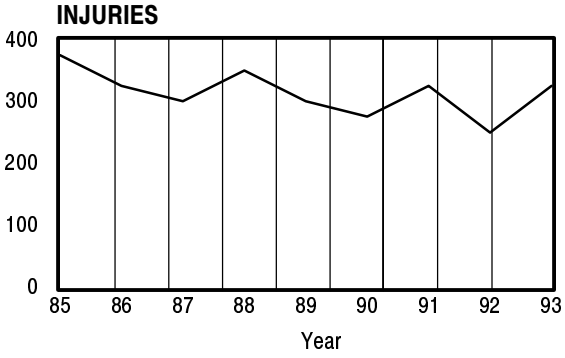
1985	7.5	1990	6.0
1986	8.0	1991	6.5
1987	8.0	1992	6.0
1988	8.0	1993	5.5
1989	6.5		

9-Year Trend = –31.1%



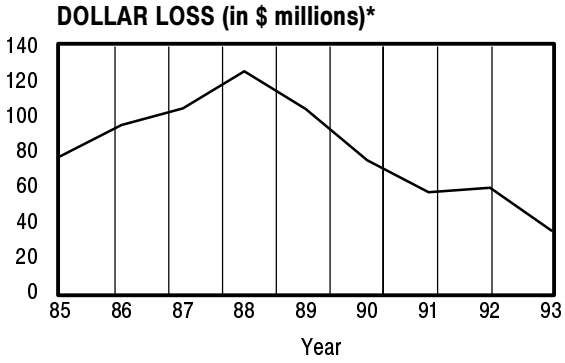
1985	85	1990	20
1986	50	1991	40
1987	50	1992	30
1988	45	1993	40
1989	35		

9-Year Trend = –60.4%



1985	375	1990	275
1986	325	1991	325
1987	300	1992	250
1988	350	1993	325
1989	300		

9-Year Trend = –17.4%



1985	$ 77.1	1990	$ 74.8
1986	94.7	1991	56.6
1987	104.4	1992	59.2
1988	125.3	1993	34.9
1989	104.0		

9-Year Trend = –51.4%

*Adjusted to 1994 dollars

Note: Hotel/motel fires in 1994 are treated as other residential property fires (see next section).

Sources: NFPA Annual Surveys and Consumer Price Index

Figure 66. Trends in Hotel/Motel Fires and Fire Losses

Causes

Most fires in hotels start in the guest rooms. Since heating is central and professionally maintained, the leading causes tend to be careless acts that guests can commit in hotel rooms, especially intentional acts (arson) by employees or guests. Cooking fires are second, but these usually originate in the hotel's centralized restaurant, not in the rooms. Appliances and careless smoking rate third and fourth, respectively.

The overwhelming leading cause of hotel fire deaths reported in 1994 is careless smoking at 67 percent (Figure 67). Cooking, electrical distribution, and other heat all tied for second at 11 percent. For fire injuries, careless smoking is first, followed by arson. These two causes have switched position since 1990.

Trends

Trends in causes of hotel/motel fire injuries are erratic; Table 13 compares the top three causes of fire injuries in 1985 and in 1994.

Table 13. Trends in Leading Causes of Hotel/Motel Fire Injuries

Rank	1985	1994
1	Arson	Careless Smoking
2	Careless Smoking	Arson
3	Cooking	Cooking

Note: Data provided in Appendix B, Table B–4.

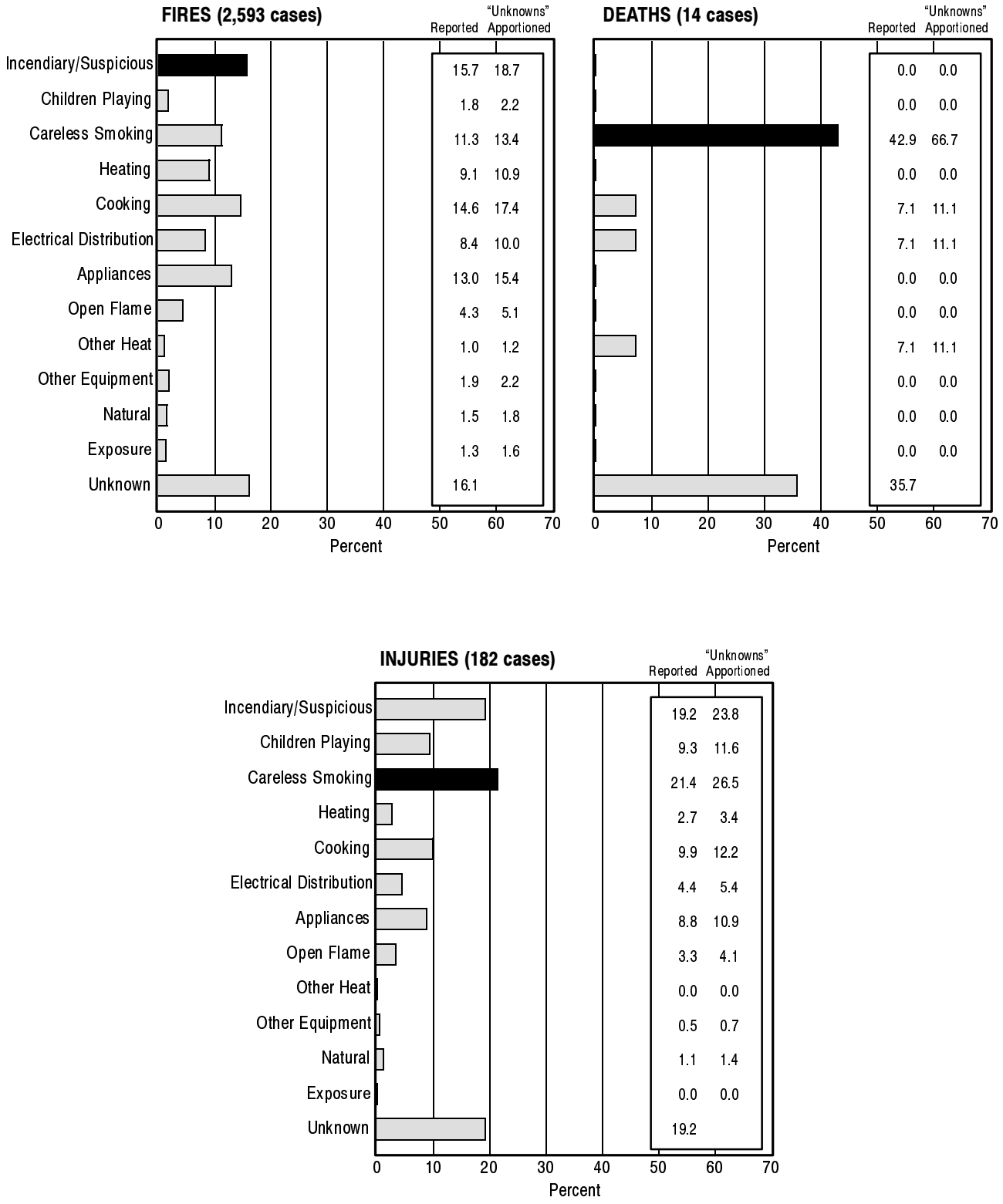
Source: NFIRS

Figure 68 shows the top five causes of fires. The trend in fires was downward for each, but less so than their drops for deaths and injuries. A survey conducted for the American Hotel and Motel Association found that virtually all hotel rooms in the United States have detectors and about half have sprinklers. This may be why the casualties are down sharply.

Trends in causes of deaths were erratic because of the small numbers in each cause category and are not shown here; however, there were dramatic drops in careless smoking deaths and arson deaths, which together caused total hotel fire deaths to be cut in half during the 9-year period examined. The hotel industry has instituted major changes—built-in fire protection systems and employee fire-awareness training are but two—that have been instrumental in this drop in fire deaths. The data on all 12 causes of hotel/motel deaths are shown in Appendix B, Table B–4.

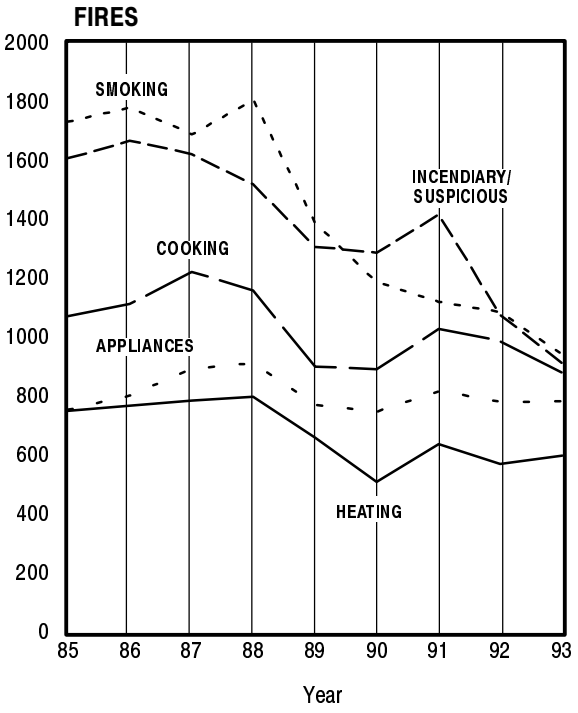
OTHER RESIDENTIAL PROPERTIES

Other residential properties include rooming houses, dormitories, home hotels, halfway houses, and miscellaneous and unclassified properties reported as residences (and coded as NFIRS



Source: NFIRS

Figure 67. Causes of 1994 Hotel/Motel Fires and Fire Casualties



Note: Data for all 12 causes provided in Appendix B, Table B–4.

Sources: NFIRS and NFPA Annual Surveys

Figure 68. Trends in Leading Causes of Hotel/Motel Fires

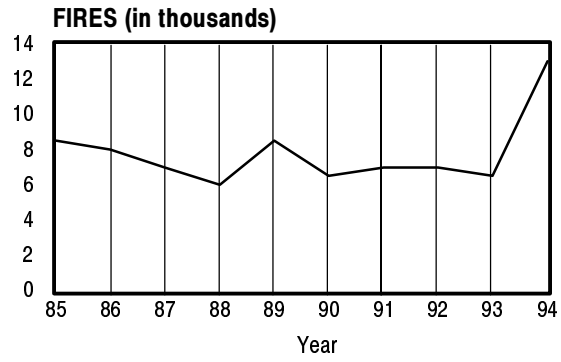
fixed property use #4). In 1994, hotels/motels are also in this category. The other residential properties category does not include homes for the elderly, prisons, orphanages, or other "institutions"; these have their own NFIRS categories under fixed property use #3 and are addressed in Chapter 4.

Trends

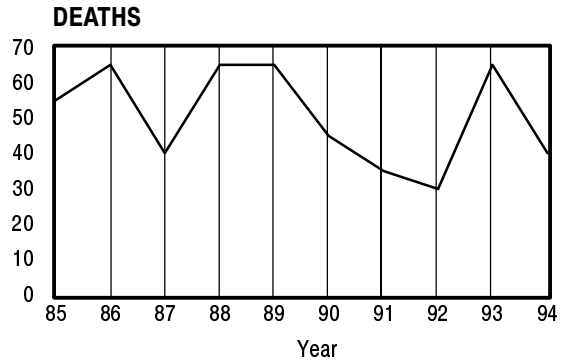
Figure 69 shows that the number of fires in the other residential category rose and fell over the 10-year period, spiking in 1994 due to the addition of hotels and motels to this category. Trends are not shown for this reason. Through 1993, the overall trend, however, is downward. Fire deaths ranged from 65 to 30 a year. Injuries ranged from 125 to 550 and adjusted dollar loss from $26 to $102 million. As with fires, the trends are downward through 1993. Other residential properties are a smaller portion of the residential fire problem than are detached garage fires, except in fire deaths.

Property Types

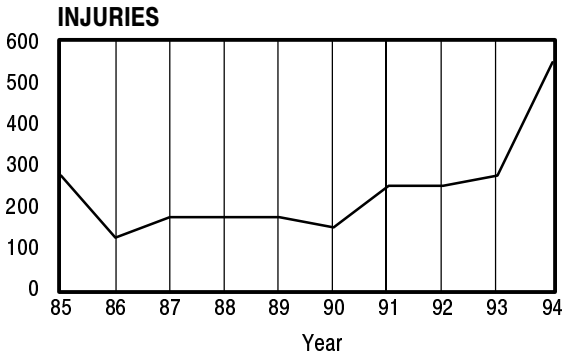
Figure 70 shows that hotels and motels in 1994 accounted for more fires, injuries, and dollar loss than all of the miscellaneous other residential categories combined, but far less than one- and two-family dwellings or apartments. Rooming house fires account for only slightly fewer fire deaths than hotels and motels, but receive much less attention. Some of these rooming houses are halfway



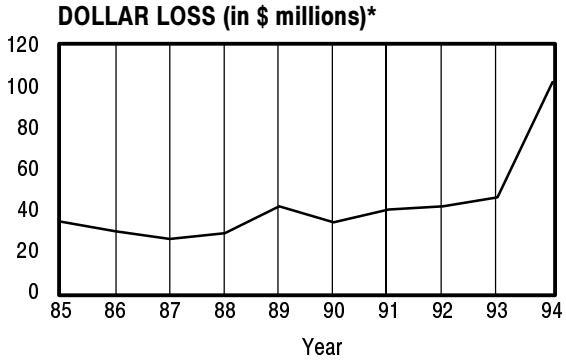
1985	8.5	1990	6.5
1986	8.0	1991	7.0
1987	7.0	1992	7.0
1988	6.0	1993	6.5
1989	8.5	1994	13.0



1985	55	1990	45
1986	65	1991	35
1987	40	1992	30
1988	65	1993	65
1989	65	1994	40



1985	275	1990	150
1986	125	1991	250
1987	175	1992	250
1988	175	1993	275
1989	175	1994	550



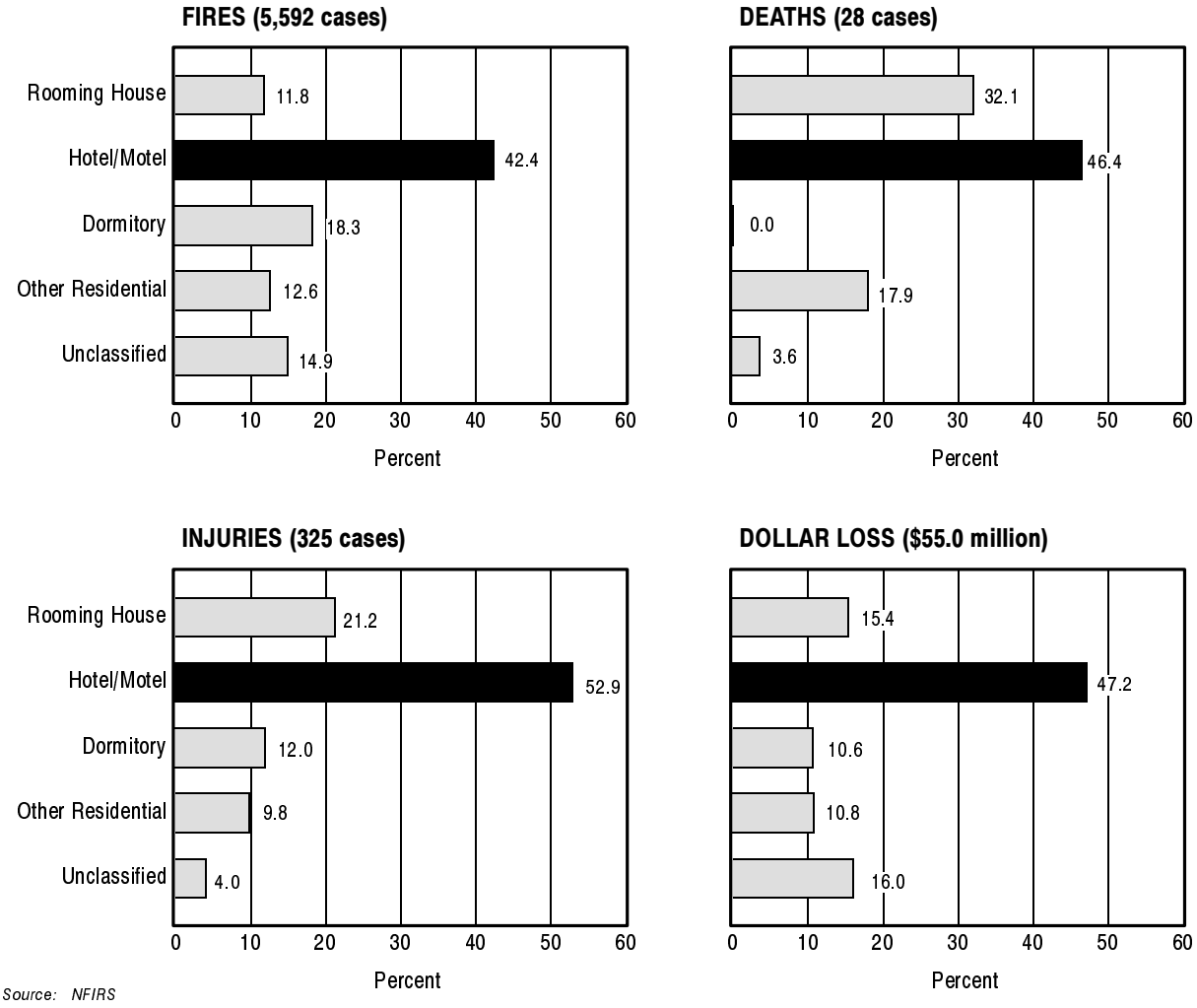
1985	$ 34.4	1990	$ 34.0
1986	29.7	1991	40.3
1987	26.1	1992	51.8
1988	28.8	1993	46.2
1989	41.8	1994	102.0

*Adjusted to 1994 dollars

Note: Hotels/motels were included in 1994.

Sources: NFPA Annual Surveys and Consumer Price Index

Figure 69. Trends in Other Residential Property Fires and Fire Losses



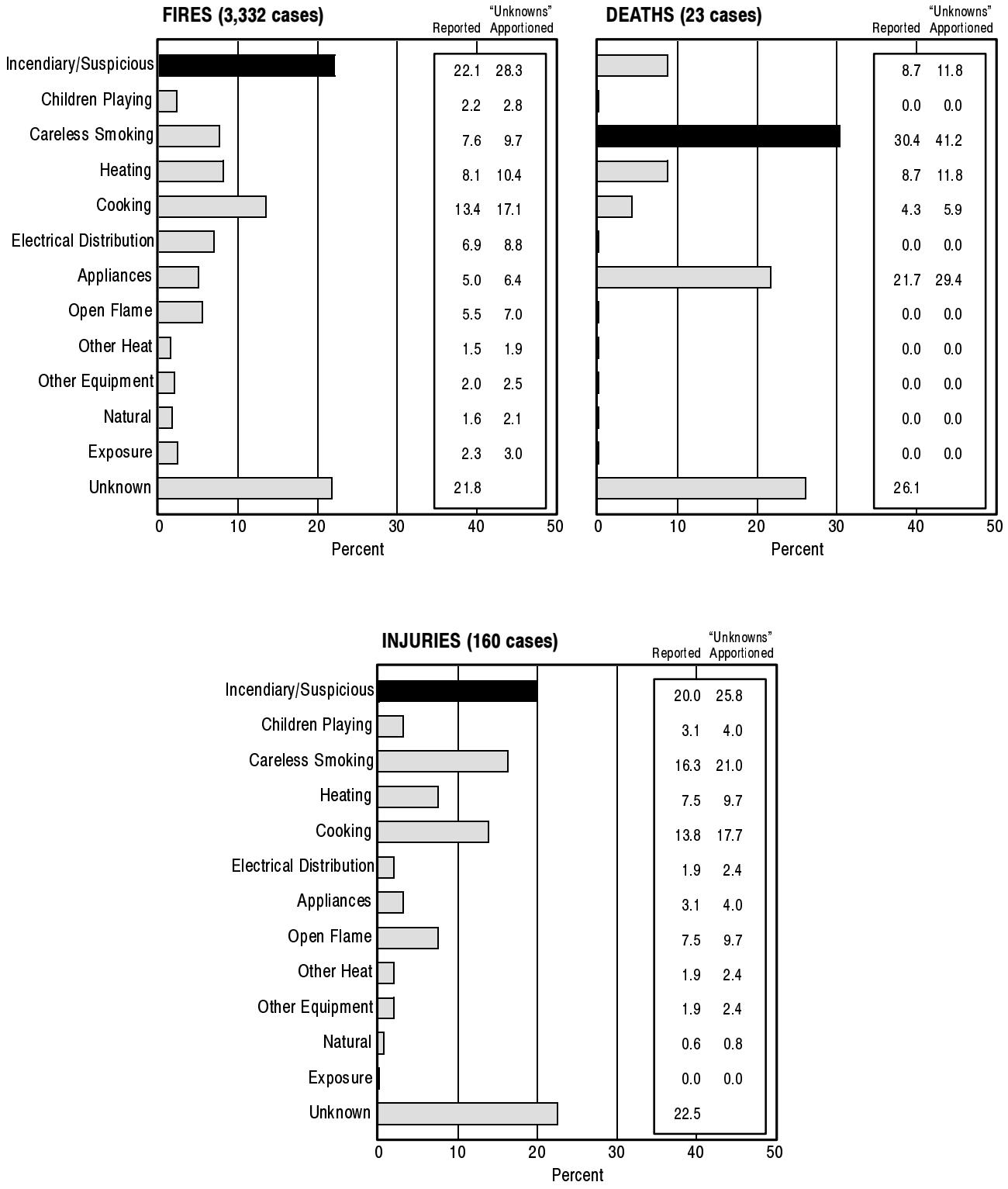
Source: NFIRS

Figure 70. 1994 Other Residential Property Fires and Fire Losses by Property Type

houses for the physically or mentally handicapped. Dormitory fires do cause deaths, of course, despite their being none in the NFIRS sample in 1994.

Causes

As in 1990, arson was the leading causes of fires and injuries in other residential occupancies, whereas careless smoking was the leading cause for fire deaths (Figure 71).



Source: NFIRS

Figure 71. Causes of 1994 Other Residential Property Fires and Fire Casualties

USFA RESOURCES ON FIRES IN RESIDENCES

The vast majority of civilian fire deaths and injuries continue to occur in residences. Residential occupancies also account for the largest annual dollar loss, and more firefighter injuries occur fighting fires in residences than in other types of occupancies. For these reasons, the U.S. Fire Administration has a variety of initiatives that focus on reducing residential fires and the deaths and injuries that they cause.

Public fire education is a cornerstone of USFA's fire prevention programs. USFA continues to attack barriers to public fire education programs at the state and local levels by developing public education tools, public awareness campaigns, and technical materials. USFA also promotes school system acceptance of fire safety education in K–12 and encourages private sector commitment and support for community fire prevention.

Many of the following topics are also addressed at the USFA's Web site at *http://www.usfa.fema.gov.*

Publications

To support and encourage public fire education, USFA has developed a series of public awareness campaign kits, which are described below. Each campaign kit has a variety of high-quality, ready-to-use materials for use by educators, community organizations, fire departments, and the private sector. Most campaigns promote home fire safety, primarily in one- and two-family dwellings, where about 70 percent of residential fires, deaths, and dollar loss occur.

USFA also produces a number of materials designed to improve the quantity and quality of public fire education efforts throughout the country. *Leadership in Public Fire Safety Education–2000* (#FA–135) presents the findings of a national public education conference held at the National Emergency Training Center. *Public Fire Education Today* (#FA–98) profiles hundreds of quality fire safety education programs being conducted across the United States. *Directory of National Community Volunteer Fire Prevention Programs* (#FA–92) is a catalog of local fire safety education programs addressing such issues as fire and burn prevention in the home, eliminating hazards, fire survival and escape, smoke detections and fire extinguishers, and the proper use of home heating devices. The *Short Guide to Evaluating Local Public Fire Education Programs* (#101) is a tool public fire educators can use to evaluate the effectiveness of a local fire prevention program.

These USFA publications are available by writing (include publication number if given in parentheses):

U.S. Fire Administration
Federal Emergency Management Agency
Publications Center, Room N310
16825 South Seton Avenue
Emmitsburg, MD 21727

Documents may also be ordered via the World Wide Web: *http://www.usfa.fema.gov.* USFA publications are free.

Video Training

FEMA's Emergency Education NETwork (EENET) provides video training and education via satellite for the fire service and emergency management community. EENET programs are satellite-distributed videoconferences broadcast over the "C" band and allow for audience interaction when originally broadcast. Each program is designed as a standalone training activity of 4-1/2 hours, and student materials are provided for each workshop.

Past programs focusing on fire prevention and public fire education topics include the following:

- *The Last Great Challenge: Fire Prevention*, September 27, 1989
- *Corporate Commitments to Fire Prevention*, October 17, 1991
- *Fire Administration Fire Prevention/Education Showcase*, October 23, 1991
- *How Effective Is Your Fire Prevention Program?,* May 6, 1992
- *Leadership in Public Fire Education: Trends and Issues*, July 8, 1992

Tapes of broadcasts from 1989 to the present are available for a modest cost through:

The National Audiovisual Center
National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161
(703) 487–4650
http://www.ntis.gov

In addition, all broadcasts prior to 1989 and all current broadcasts may be borrowed from your State Emergency Management Office or from your FEMA regional office.

For further information on EENET, or if you would like to get on the EENET mailing list, contact:

Emergency Education NETwork
National Emergency Training Center
16825 South Seton Avenue
Emmitsburg, MD 21727
(301) 447–1068; (800) 527–4893; Fax: (301) 447–1363

National Fire Academy Courses

USFA's National Fire Academy (NFA) works to enhance the ability of the fire service and allied professions to deal more effectively with fire and related emergencies. Courses are delivered on campus at the resident facility in Emmitsburg, Maryland, and off campus throughout the nation in cooperation with state and local fire training officials and local colleges and universities. An initiative begun in 1992 offers NFA resident courses on a regional basis.

While issues related to fires in residences and fire prevention are addressed in numerous academy courses, several offerings include these issues as a major thrust. NFA's course on *Strategic Analysis of Fire Prevention Programs* (Resident Course #R309) is a 2-week course that helps senior fire executives identify strategies for improving their fire departments' fire prevention activities. *Management of Fire Prevention Programs* (Resident Course #R225) uses management concepts as a basis for the efficient operation of a fire prevention organization. *Fire Prevention Principles* (Resident Course #R220) provides the student with the fundamental knowledge, skills, and attitudes to conduct basic fire safety inspections. *Principles of Fire Protection: Structures and Systems* (Resident Course #R222) is a 2-week course designed to meet the professional development needs of the advanced fire prevention officer. *Code Management: A Systems Approach* (Resident Course #R101) addresses the management of code development, evaluation, and enforcement processes. Other offerings include *Fire Service Instructional Methodology* (Resident Course #R113) and *Developing Fire and Life Safety Strategies* (Resident Course #R352).

For information about course offerings, eligibility, and application procedures, write to:

The National Fire Academy
U.S. Fire Academy
16825 South Seton Avenue
Emmitsburg, MD 21727

Information on National Fire Academy course offerings can also be obtained on the USFA Web site at *http://www.usfa.fema.gov*.

The National Fire Academy off-campus materials for the *Public Fire Education Planning* (1985) and *Conducting Basic Fire Prevention Inspections* (1985) courses are available for purchase for locally sponsored delivery from the National Audiovisual Center. Current academy off-campus courses, consisting of an instructor guide, student manual, and supporting audiovisual aids are also available. For information on how to order courses, contact the National Audiovisual Center at the address and phone number listed earlier.

Campaign Materials

USFA has developed a series of public awareness campaign kits with a variety of high-quality materials for use by educators, community organizations, fire departments, and the private sector. *It's a Real Protector, It's a Smoke Detector* (English and Spanish) promotes the use of smoke detec-

tors. It includes radio and print public service announcements (PSAs), sample letters to the editor, a fill-in-the-blank press release, and a resource guide. *Make the Right Call EMS (Emergency Medical Services)* is a campaign that uses the media to educate Americans about EMS and its proper use through new coverage, feature and entertainment articles, and PSAs.

ONE- AND TWO-FAMILY DWELLINGS. Most campaigns promote home fire safety, primarily in one- and two-family houses, where most residential fires, deaths, and dollar loss occur.

The most recent campaign, *Home Fire Safety: Act On It*, was developed in cooperation with the Sleep Products Safety Council, the National Association of Broadcasters, the National Board of Realtors, and the "Just Say No" campaign. It contains a variety of materials on general home fire safety themes. *Working Together for Home Fire Safety—A USFA Public Private Partnership* was designed for corporate managers to disseminate home fire safety tips to their employees. Camera-ready materials focus on careless use of smoking materials, unsafe use of alternate heaters, facts about the basic myths of fires, and the importance of practicing a home escape plan.

Other campaign kits focus on specific topics of home fire safety. *Let's Retire Fire* (#5–0129) provides fire safety tips for older Americans. *Curious Kids Start Fires* (#5–0101 in English or #5–0132 in Spanish) focuses on curiosity fireplay. *This Is Fire* (#5–0123) includes hard-hitting messages about the fatal characteristics of fire—that it is fast, dark, hot, and deadly. *Check Your Hot Spots!* (#5–0101) addresses safe use of alternate heaters, especially in rural homes. *Children and Fire: The Experience of Children and Fire in the United States* presents a detailed look at fires involving children, including the number of children killed in fires in 1991, U.S. counties with the highest rates of child fire deaths, death rates among different ethnicity groups, characteristics of fires that kill and injure children, importance of smoke detectors in preventing child deaths and injuries, and characteristics of children playing fires.

USFA also conducts special studies to address specific problems and current issues facing the nation's fire and rescue service. The technical reports produced under the Major Fires Investigations series analyze major or unusual fires with emphasis on sharing lessons learned. They are directed primarily to chief fire officers, training officers, fire marshals, and investigators as a resource for training and prevention.

A number of Major Fires Investigations reports focus on residential fires in one- and two-family homes: *Seven-Fatality Christmas Tree Fire, Canton, Michigan, December 1994* (#046); *Power Off to Hard-Wired Detector in Nine-Fatality House Fire, Peoria, Illinois, April 1989* (#031); *Eight Children and Two Adults Die in Rural House Fire, Remer, Minnesota, January 1989* (#028); *Four House Fires That Killed 28 Children, September–December 1987* (#020); *Eight-Fatality Row-House Fire, Chester, Pennsylvania, December 1992* (#067); and *Children Left Home Alone: Eleven Die in Two Fires, Detroit, Michigan–February 1993* (#070).

APARTMENTS. *An Information Backgrounder on Fire Resistant Construction and Building Codes* (#FA–70) is a three-page booklet explaining the importance of fire-resistant construction and how construction features contribute to fire control in multifamily dwellings.

USFA also has recent Major Fires Investigation reports that address major fires in apartment buildings: *Apartment Complex Fire—66 Units Destroyed, Seattle, Washington, September 21, 1991* (#059); *New York—Schomberg Plaza Fire, Harlem, 1987* (#004); *Apartment Building Fire, East 50th Street, New York City, January 1988* (#019); *Sixteen-Fatality Fire in High-Rise for the Elderly, Johnson City, Tennessee, December 1989* (#030); *Nine Elderly Fire Victims in Residential Hotel, Miami Beach, Florida, April 1994* (#041); *Fire, Police, and EMS Coordination at Apartment Building Explosion, New York City, November 1992* (#068); and *Nine-Fatality Apartment House Fire, Luddington, Michigan, February 1993* (#072).

HOTELS AND MOTELS. USFA has worked very diligently in the implementation of PL 101–391, The Hotel/Motel Fire Safety Act of 1994. By working closely with the American Hotel and Motel Association and the National Association of State Fire Marshals, USFA provided a variety of support services to states to help them identify facilities that meet the fire safety requirements of the Act.

Major Fires Investigations reports studying fires in hotels and motels include the following: *Seven-Fatality Hotel Fire, Grand Carais, Minnesota, July 1991* (#055); *Indiana—Ramada Inn Air Crash and Fire, Wayne Township, October 1987* (#014); *Louisiana—Doubletree Hotel Fire, New Orleans, July 1989; Texas—La Posada Hotel Fire, McAllen, February 1987* (#001); and *National Guard Plane Crash at Hotel Site, Evansville, Indiana, February 1992* (#064).

OTHER RESIDENTIAL PROPERTIES. Several Major Fires Investigations reports share lessons learned in major fires in other types of residential properties, including *Nine Elderly Fire Victims in Intermediate Care Facility, Colorado Springs, Colorado, March 1991* (#050); *Virginia—Twelve-Fatality Nursing Home Fire, Norfolk, November 1989; Virginia—Shenandoah Retirement Home Fire, Roanoke County, December 14, 1989; Virginia—Success Story at Retirement Home Fire, Sterling, December 16, 1989; Nine Elderly Fire Victims in Residential Hotel, Miami Beach, Florida, April 1994* (#041); *Delaware and Virginia—College Dormitory Fires in Dover and Farmville, April 1987*; and *North Carolina—Nine-Fatality Manufactured Housing Fire, Maxton, November 1989*.

RESIDENTIAL SPRINKLERS. USFA has completed extensive research to develop installation and application standards for quick-acting residential sprinklers and has conducted a variety of demonstrations of the quick-response sprinkler technology to demonstrate the practicality of these systems. USFA's report *Residential Fire Sprinklers Retrofit Demonstration Project Final Report and Case Studies* (#FA–89, #FA–90, #FA–96, #FA–97) describes a multiple-stage demonstration project in multifamily residences undergoing rehabilitation where quick-response residential fire sprinklers were installed.

USFA also worked with Factory Mutual and Underwriters Laboratories to complete design and testing of new limited-water-supply fire sprinkler systems for manufactured housing.

There are a number of other publications on sprinklers available from USFA. An *Information Backgrounder on Fire-Resistant Construction and Building Codes* (#FA–70) is a three-page booklet explaining the importance of fire-resistant construction and how construction features contribute

to fire control in multifamily dwellings. *An Ounce of Prevention* (#FA–76) is an 18-page booklet for homeowners, insurance underwriters, building designers and developers, legislators, and building officials. The booklet provides a comprehensive discussion of why and how the combination of automatic sprinklers and early warning systems in all types of buildings can have a major impact on fire-related deaths, injuries, and property loss.

Home Fire Protection—Quick-Response Fire Sprinkler Systems (#FA–43) is a five-page pamphlet for the general public explaining the merits of home sprinklers and the financial and insurance benefits.